THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. X. No. 227—13th YEAR.] LONDON, JULY 2, 1861. [Subscription per Ann. { 15s. in Advance / 18s Credit.] DOUBLE No. Price 1s.

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TO GAS-METER MANUFACTURERS AND OTHERS.

THE Undersigned hereby caution Meter Manufacturers and others against infringing the exclusive right of the Undersigned to the use of the Screw Adjustment for regulating the Height of the Overflow-Pipes in Wet Gas-Meters, as described in the Specification of the Letters Patent granted to Crosley and Goldsmith on the 19th of April, 1856; as well as against infringing any other portions of that or any other Patent of the said William Crosley; and

NOTICE is further given, that all Infringers of the said Inventions, or any portions of them, will be proceeded against.

CROSLEY & CO.,
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LONDON, Aug. 29, 1859.

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RICHARD JONES,
Engineer to the London Gaslight Company.
Vauxhall, London, Nov. 9, 1859.

THREE
MEDALS AWARDED TO
THOMAS GLOVER'S
PATENT DRY GAS-METERS.

LORD REDESDALE'S "SALE OF GAS ACT."

DRY METERS *VERSUS* WET METERS.

LONDON, February 25, 1861.

THOMAS GLOVER begs to call the attention of Gas Companies and others to a few *facts*, which, if duly considered, must lead to most important conclusions :—

1. That since THOMAS GLOVER commenced to manufacture his Patent Dry Gas-Meters (which is now upwards of 15 years), every Wet Meter Maker of any importance in England has been compelled to manufacture Dry Gas-Meters; and in the JOURNAL OF GAS LIGHTING, of date of 12th of February, 1861, Messrs. William Parkinson and Co., successors to the late Samuel Crossley, advertise that they "intend manufacturing *Dry* as well as" Wet Meters, and it is worthy of particular notice that they intend to do so "after 40 years experience in manufacturing Wet Gas-Meters of such a quality that has enabled them, as they say, to maintain a superiority over all other; and this, be it also particularly noticed, after they had advertised in the JOURNAL OF GAS LIGHTING, January 29, 1861, "their improved low-spouted Gas-Meter with new patent float arrangement, which entirely overcomes the difficulty experienced by ordinary Wet Meter."

2. That it is quite consistent with THOMAS GLOVER'S knowledge that Wet Gas-Meters, called "low-spouted" or "compensating Wet Meters," have already been proved to be incapable of continuous working or registration, and for this reason the manufacturers of these Meters have been induced to seek the repeal of Lord Redesdale's (righteous) Sale of Gas Act.

3. That every year the Patent Dry Gas-Meter manufactured by THOMAS GLOVER has risen in favour with Gas Companies and Gas Consumers, placing him in the proud position of being the largest manufacturer of Gas-Meters in the country.

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THOMAS GLOVER guarantees to uphold all Meters sold by him for 5 years free of expense to the purchaser, or for a trifling per centage per annum will contract with any Gas Company to uphold their Meters of his manufacture for a series of years; and, at the conclusion of such contract, to lease the Meters all in perfect working order.

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(SUCCESSORS TO SAMUEL CROSLEY),

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NOTICES.

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THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JULY 2, 1861.

NOTES UPON PASSING EVENTS.

THERE has been no fire in London at all to be compared with that which last week devoured a great part of the Tooley Street wharves and warehouses, and buried poor Mr. Braidwood under the ruins, since 1794. In that year, on the 21st of July, a fire broke out in Wapping, which consumed an East India warehouse, stored with 135,000 bags of saltpetre, and 600 houses. The loss was estimated at a million; that of the fire last week has been put down at two millions. It is a fact worthy of notice, and likely to be the subject of future legislative action, that Mr. Braidwood fell a sacrifice to the infraction of precautions on which he had always insisted. He laid it down as an axiom in fire insurance, that warehouses stored with inflammable goods should be divided by strong party-walls, without communications of any kind. He repeatedly said, in discussions on the subject, that where there was a door, if it were shut, smoke and air would pass; and, where smoke would pass, fire could pass too. It is possible that doors may be made air-tight, and even fire-proof; but, practically, they are seldom closed when wanted. There are great delusions on the subject of fire-proof buildings amongst those who have paid but little attention to the subject. Supposing a warehouse constructed of incombustible materials, if it be filled with combustible goods, which take fire, it becomes at once a furnace, and its endurance will depend on the capability of the walls and floors to bear the expansion caused by the heat. The iron doors at the fire the other day were curled up like writing paper by the heat. If a fire break out in a building divided by sufficient party-walls, without doors or cellars communicating with the adjoining blocks, in the first place, it will be within manageable compass, more easily subdued by the exclusion of external air and the pouring on of water; and, in the next place, at the most, the fire will burn itself out, leaving the main walls standing. In Tooley Street, for some time, there was a doubt whether the fire would not extend through cellars of unknown breadth, stored with goods of unknown character, across to the railway station, at a sacrifice of property which would have been counted in millions. Of course, it is most convenient for mercantile purposes that there should be easy communication between the floors of adjacent blocks of warehouses. The convenience must be set against the risk; and, what is more pressing, perhaps, the Rules of Insurance Companies. In Liverpool, we understand that the fire offices peremptorily limit the area of warehouses in which combustible goods are to be stowed, thus limiting their risk. It will be a subject for consideration, whether the London offices should not follow the provincial example. Precautions, in the way of tanks on roofs, pipes, and pumps, seem never to be of any use when needed.

In a recent number of the *Revue des Deux Mondes*, there is a notice of the life and works of the late Leon Faucher, known here both as a minister of state, and as author of *Etudes sur L'Angleterre*. M. Faucher visited England in 1843–4, at the time the country, suffering under commercial distress, was in the throes of the anti-corn-law struggle; when each of the two parties was intent on exaggerating the misdoings and misfortunes of its supposed enemies. But, says the reviewer—M. Louis Reybaud—"Manufacturing England is no longer the England that Faucher described; her passing ills have in great part been overcome by the vital strength which breathes through her institutions." "What has caused this change? The happy termination of the labour of which Leon Faucher saw only the throes. A manifest improvement has taken place in the condition of the working classes since the completion of the economical reforms which began with the repeal of the corn laws. Wages have risen; employment is plentiful; periods of distress are rare, and of less gravity; the animosities of party are in great part disarmed, in consequence of concessions which have been made, and prosperity which exists; and, finally, the *habits of the people, which are regulated by the condition of their wants*, have been improved in proportion to the improvement of their means of livelihood. Thus, in a few years, Faucher's pictures have become out of date." The reviewer then goes on to say that it would be easy, taking the exceptional cases of Coventry or the improvident dock labourers, reduced to distress by the long frost in London, to give an entirely false idea of the general condition of England.

In another paper in the same review, M. Forcade remarks that, while French finance ministers are seeking to extend the domain of the excise by putting a tax on lucifer matches for instance, the English minister has repealed a million and a half of the same class of taxation in the duty on paper. "Thus, England, in the face of the disturbed condition of Europe, gives an example of reduced taxation."

These are observations worth the attention of the masons and carpenters, who are now on strike in order to resist payment by the hour at the highest rate ever yet paid—an arrangement which continental workmen would accept as a boon, if only permitted to work long hours in the long light days of summer. This strike question has passed beyond the power of argument; it is a struggle for power on the part of the leaders of the trades unions. The masters have been driven from their natural condition of competition into a class union; and, consequently, there can be very little doubt of the result of the contest. Iron will be used as much as possible to replace wood; machinery to execute carpentry; foreign workmen will immigrate in large numbers; and the police will have orders to be as vigorous in removing pickets as in arresting costermongers.

If we are to believe the pictures of the working classes

painted by the French, their condition in that country has been rather deteriorating than improving within the last twenty years. The agricultural journals are full of complaints of migration from the rural districts—of the want of parental authority, and the necessity of introducing among farm labourers a system of combined written character and passport, to which the artisans are already subject, under the name of "*livret*;" while writers like Michelet and Prudhon depict in the most sombre colours the state of the working classes in towns. The general complaint echoed by M. Claveau and M. Rogues, in the *Revue Contemporaine*, is that domestic life—"*la vie de famille*"—has ceased to exist for the workman in France. M. Jules Lecompte assents to this lamentable statement, and in a valuable book, "*La Charité à Paris*," endeavours to show how charitable associations have supplied the "want of parents and guardians." We suspect that there is some exaggeration, the result of strong political and social opinions, in these gloomy descriptions of the lives of French operatives. At any rate, we have in the report of our census, the Poor-law Commissioners, and the returns of the food consumed by, and the wages paid to, our English factory operatives, mechanics, and agricultural labourers, ample evidence that their physical, social, moral, and educational condition has improved, and is improving. The condition of a woman working in a modern factory of cotton or silk, under modern regulations, is as superior to that of the peasant girl or wife carrying dung on her back to a field, and going through the hardest labour of a peasant's farm in France or Flanders, as that of a well-to-do farmer's wife, in a good dairy or wine country, to an Indian squaw trailing her husband's tent-poles. We observe that the *Revue Contemporaine* gives the following often-quoted passage from the admirable poet and Nature-describer, and miserable political economist, Michelet:—"*Les fabricants Anglais, énormément enrichis par les machines récentes, vinrent se plaindre à M. Pitt et dirent: 'Nous n'en pouvons plus, nous ne gagnons pas assez.' Comme on avait déjà pris les femmes, il dit un mot effroyable qui pèse sur sa mémoire—prénez les enfants!*" We will not say that this story is a pure fabrication; but, after having taken a great deal of pains to ascertain if there was any foundation for it, not only by an examination of contemporary works, but by an application to distinguished persons connected with the Pitt family, and found not the slightest vestige of confirmation, we shall now be glad to learn from some French journal M. Michelet's authority for a statement which bears absurdity on its face. There is little doubt but that the employment of children is as old as the cotton manufacture, and was attended with great abuses. The first man to attempt to regulate infant labour was the first Sir Robert Peel—the main support of Pitt. At present, under the half-time system, factory children are better fed, better clothed, better educated, than any other children amongst the labouring community.

M. Barral, in a late number of the *Presse Scientifique*, protests against our suggestion, in our "Notes" of the 6th of June, that he could not seriously agree with the social opinions of Drs. Bertillon and Clavel, and states that he prefers the principles of 1789 to those of 1682—a misprint, we presume, for 1688. By this, we imagine that he means that he prefers a compulsory division of landed property to our laws of primogeniture and freedom of testamentary disposition. M. Barral is perfectly entitled to enjoy this opinion. Yet, as an agricultural historian, he would be puzzled to find a single great agricultural improvement in live stock, machinery, or cultivation, that had ever originated in a district of peasant proprietors. The merino is of royal and hereditary descent. The live stock now most esteemed on the continent—short-horn cattle, Leicester and South Down sheep, and Yorkshire and Berkshire pigs, are all English, and the direct result of the aristocratic hereditary system. But, M. Barral's abstract opinions will not be objected to by us while he continues to afford in the journals which he edits, such admirable accounts of the progress in scientific manufacture and agricultural cultivation of this essentially aristocratic and really free country. M. Barral's principles of 1789 are not supported by M. Rogues in a very curious article on "The Economical Condition of Labour in France and some other Countries," in the *Revue Contemporaine*, of the 15th of July, founded the publications of the Society of Social Economy. This society has published six volumes, containing sixty-four monographs of different workmen. It is probable that those on France have some value; they are certainly very amusing; but, M. Le Play's sketches of English workmen are utterly absurd, as might be expected, if we imagine an English professor going into a French mechanic's lodgings, cross-questioning him as to his earnings, his expenditure, and his religion, and putting down and publishing the answers condensed into a few sentences. The society's last-published volume contains six French examples. "The Peasant-soap-maker of Basse Provence," "The Embroiderer of the Vosges," "Vineyard Labour in Aunis," "The Shirt-maker of Lille," "The Rural Schoolmaster," and "Family Labour in Paris;" and, amongst the foreign sketches, "The Placer Miner of Mariposa, California," "formerly a newsman, at present a citizen of the world, working, in right of first possession, at a *claim* in America, Australia, or Peru." The reviewer seems astonished at finding amongst the soap-manufacturers of Marseilles, workmen whose forefathers, for generations, have been in the same employment—a very common case in England in old establishments where large capital employs many hands. He is also shocked at the habits of day labourers and Jacks-of-all-trades, who live from hand to mouth. A taste for vagabondage is the instinct of certain natures, which neither rules nor laws could cure. In the following passage, he makes a remarkable admission as to the effect of the division of landed property, which we in this country consider so opposed to social and agricultural progress. He says—"Peasants (French) having the public market for customers, maintain themselves firmly from generation to generation in the position of both landed proprietors and labourers; but two powerful influences are secretly undermining the foundations of this system—the indefinite division of inheritances, which reduces the peasant to the condition of a day labourer (for peasants employers), and the concentration of manufacturing labour in great establishments, to the destruction of small workshops. The division of inheritances tends to withdraw the land from the hands of those who cultivate it. A fatal descent is inevitably conducting families of peasant proprietors either to destitution or to *sterility*." The author also complains that capital and machinery threaten all small manufactories. This is not the case in modern England; increased demand, increased cheapness of raw material, and necessity for repairs, support the village blacksmith, wheelwright, tailor, shoemaker, and watchmaker; while many trades—the corn trade, for instance—are under the influence of railroads and telegraphs, passing into the hands of "little men." The reviewer seems much puzzled to decide on the respective merits of the private alms and public assistance: of the latter, he says—"Organized assistance is rarely received with gratitude. Some take it as alms, others claim it as a right." This is one of the difficulties which our poor-law system, in a great degree, meets; but, in France, for want of men of education and means, out of great towns, the machinery of our guardians is entirely wanting, and the working of public relief becomes purely official. As to the question of wages, the reviewer remarks that the poor in the country have small resources unknown to dwellers in towns. "The grass on the roadside enables them to feed a cow or a goat; the seaside population get shell, and other fish; fuel is often to be had for gathering; *snails* are collected in vineyards; and *acorns* in the forests." He mentions, as something extraordinary, that the Parisian workmen are regularly supplied with *café au lait*, and even black coffee by itinerant vendors who ply round the public workshops, evidently not aware that tea and coffee are consumed at least twice a day by our masons, carpenters, and plasterers, with plenty of good sugar, and exclaims, "What a contrast is the consumption of the Parisian workman to the substantial potatoes, and still more substantial porter which are offered for sale in English workshops! "Butchers meat is rarely eaten by the peasantry of France, only on great occasions, harvest-feast, and wedding. "In all the latitudes of the French continent, the foundation of the family meal is in the salting-tub, unless it hangs from a rafter, or is smoking in some vast chimney. Thus bacon, with cheese, appears on their humble boards at least twice a week." "The latest inquiries of the society, unfortunately, show the difficulties inflicted on the working classes of all parts of France from universally high rate of rent, to cost of provisions." "It has been said that this excessive dearness is a proof of prosperity—our English neighbours think differently, and consider cheapness prosperity." "France," he continues, "had numerous natural and agricultural wealth; she had neither too many hands, nor too much capital for fertilizing her fields, reclaiming her wastes, draining her marshes, and, in fact, developing an exceptional

soil and climate. But centralization desired to force France to become a manufacturing country, and our governments and laws have sacrificed the richest harvest and the finest pastures to propping up factories and forges." "Thousands of industrious hands are drawn from agriculture to unprofitable manufactures, and the unproductive adornment of cities. To this principal cause of the dearth and price of meat, may be added another—the diminution of the number of children in the families of our rural population. Unfortunately, *intentional sterility* increases in all classes of society, but especially amongst the rural classes; everywhere it is connected with a lowered tone of morality, and gross materialism, and nowhere has it such fatal consequences as in the agricultural districts." "In these days, in order to find in the purely rural regions, whole populations, where the parent is venerated and obeyed, we must leave thickly-populated districts, and seek the most remote hamlets and villages." And the reviewer quotes the following passage:—"The bonds of family affection are so relaxed, that the parents have no affection for any except their infant children, while the sons have lost all filial sentiments; and, as they approach manhood, look forward with pleasure to the time when they can divide the paternal acres, or cease to pay the annuity they have agreed on for their use." "Accustomed to divide inheritances, however small, every one, as a matter of course, insists on the letter of the law, and the slightest suspected inequality of division leads to vehement disputes, and often to appeals to the courts." Further, we learn that, while the Saturday half-holiday is becoming an institution in England at the cost of employers, in France "a movement in the opposite direction is being propagated from Parisian examples—working on Sunday, making holiday on Monday, and sometimes Tuesday"—days of profit for the taverns and museums, for wife and children!" These extracts may tell a few of the men on strike, that in England, "with all her faults," the condition of the working man is more improved and improving than in any other country in Europe.

We hear from Egypt that the promoters of the Isthmus of Suez scheme are already driven to the slave system of forced labour—the system that built the useless pyramids. M. de Lesseps has obtained from the pasha power to obtain ten thousand workmen by force. M. Ninet, whose essay we quoted in our article on cotton supply (June 4), confirmed from personal knowledge, the fact that agricultural Egypt is under-populated—so much so, that the want of hands seriously limits the gathering of cotton, and the production of profitable crops of cereals and oil-plants. This evil will, of course, be aggravated by the abstraction of ten thousand men, to execute an unproductive work, like the Suez Canal. The barrage of the Nile, the uselessness of which was foretold by eminent English and French engineers, sacrificed a large number of the unfortunate peasantry. The show army of the present pasha has been a second tax on the productive strength of the country; and now, M. de Lesseps has determined to drag ten thousand unfortunates from their homes and fields to die in a task—digging a canal in loose sand, in face of a steady current of mud—something like the task of Sisyphus on the ladies who worked so hard to fill sieves with water. M. de Lesseps admits that he has spent one-sixth of the proposed capital, that only one shareholder, the pasha, pays up, and that all the money raised has been sunk in preliminary works. How much it is to be regretted that M. de Lesseps has not directed his zeal and vigour toward establishing a railway, accompanied by a great system of fresh-water irrigation, through the land of Goshen—a practicable and profitable scheme, recommended by the late Robert Stephenson!

A useful discussion took place in the House of Commons, on the 25th of June, on the respective merits of the Enfield and Whitworth rifles. Torpor—a tendency to run in groves, to plod on in an established road, even although it be not ancient—is the inevitable characteristic of all establishments, whether public or private, that are paid by salary, and not by profits; the interference of an enlightened despot, or of public discussion by a Parliament and free press, is essential to counteract this stand-still and extravagant tendency. There are, perhaps, as many abuses in the locomotive manufactories of railway companies as there were in old Woolwich. There are first-rate mechanics at the head of the mechanical department of the Enfield factory. The Government has competent advisers in Sir William Armstrong and Mr. Anderson; but still, an occasional spurring will do no harm. The Enfield rifle is a very good weapon, but it is far from perfect. We have it, on the evidence of officers who served in the Crimea and India, that frequently at critical movements a number of the rifles were found unserviceable from fouling, or from some injury to the thin barrel. When the Enfield rifle was adopted, it was considered that a certain diameter of the missile was essential to destructiveness. It was this idea which long retarded the improvement of the old Brown Bess. The highest military authorities, including the Duke of Wellington and General Napier, made an impossible condition with mechanics who proposed an arm of precision—a *sine qud non*. It was thus that the French got the start of us with the Minnie rifle,—the principle of which had been invented by an Englishman, and offered and rejected by our war authorities. It was a great step in advance when Lord Hardinge accepted modifications, which made the Enfield possible. But now, Mr. Whitworth's mechanical genius, and a long series of experiments, have produced a weapon which has received, amongst other high technical authorities, the approval of General Hay, the Hythe inspector of musketry, and the National Rifle Association Committee, presided over by the Secretary at War. The military reformers naturally desire to adopt the improved weapon. But, say the opponents of any change in the Government rifle, who are of the same class of mind as those who stood up so long for Brown Bess, the cost of the Whitworth rifle, £10, makes its adoption as a national arm impossible. Mr. Vivian, who introduced the subject to the House of Commons, stated, on the authority of Mr. Whitworth, that there would be no difficulty in adapting the machinery at Enfield to the manufacture of the Whitworth, at an extra expense of about 5s. for each barrel, which would ultimately turn out more economical; while Mr. Westley Richards writes that he has rifled muskets on the Whitworth principle without any extra expense.

The superiority of the Whitworth rifle was well brought out, in a few figures, by Lord Elcho. "The mean deviation, with the best Enfield, was 12 inches in a range of 500 yards, while, with the best Whitworth, the mean deviation was 3½ inches in the same range. With the average Enfield, the mean deviation was 17 inches; with the average Whitworth, it was 6 inches. In 1852, in the firing at the rifle, there was a mean variation of 35 inches in 500 yards; in 1857, the mean variation was only 4½ inches." Its range and power are equally superior, as testified by General Hay. The real substantial objection to any change rests in the disadvantage of two different bores, and consequently two sizes of ammunition, until such time as one of the two "bores" can be worn out. Mr. Newdegate very properly pressed on the attention of the Government the necessity of obtaining a breech-loading musket. Lord Hardinge had told Mr. Westley Richards that he should never "consider the improvements complete till a breech-loading musket had been perfected." It seems that a breech-loading carbine is about to be adopted for the cavalry. Captain Jarvis, who is evidently preparing himself for office, by defending every thing official, "right or wrong," was absurd enough to say, "that Mr. Whitworth could not produce better shots than the Enfield without reducing the bore;" as if the size of the bore had not formed part of Mr. Whitworth's calculations. The debate ended in the withdrawal of the motion, its object having been in great part served by the discussion; Lord Palmerston assuring the House that the Government were pursuing a comparison of the rifles prepared on the Whitworth and on the Enfield principles, and that it would then have to be decided whether the superiority of the Whitworth was sufficient to make it advisable to discontinue the weapons in general use."

The Stettin (Prussia) newspapers mention an instance of heroic presence of mind, which deserves to be known wherever railways exist. A passenger train, coming from Altdam, in full speed, was running direct into the River Oder, at a place where it is twenty feet deep, in consequence of a mistake on the part of the pointsman at a crossing. An engine-driver, one Kampke, of Koningsberg, who was on a siding, with a locomotive and two waggons of goods for discharging into a boat on the river, saw the mistake and the danger. Without a moment's hesitation, he put on full steam; and, rushing forward, charged the coming train. The shock was tremendous; but the passenger-train was brought to a standstill, without the slightest injury to any one. The brave fellow has been presented with a purse of £80.

ANOTHER £2000 WANTED.

We have done so much towards keeping Mr. Samuel Hughes's name constantly before the public, that we considered ourselves entitled to his warmest thanks. We have, whenever an opportunity presented itself, set forth his ingenuity, his assiduity, his cleverness, his self-confidence, and other qualities which make him a capital agitator; and we have shown also that he knows how to appreciate his own services when making out his "little bill." We have done our best to advertise his claims to be employed by all who are seeking out for grievances, and wish to get up a case against gas companies. But what we have done to serve him in this matter seems to be insufficient for his purpose. He is so greedy of notoriety that it is difficult to satisfy him, and he now wishes his friends and the public to subscribe another £2000, in addition to the large sums they have already expended in giving him publicity during the proceedings in promoting the Metropolis Gas Regulation Act. He is anxious to have an organ of his own for the expression of his opinions, and thus to advertise himself more constantly, and more in his own fashion than we have done, and he has accordingly issued a circular addressed to certain parties whom he hopes may be induced to promote that object. Though directed against us, we shall not resent his ingratitude by withdrawing our patronage from him, but will aid his endeavours by giving the circular additional publicity in our columns:—

[COPY.]

14, *Park Street, Westminster, S.W., June* 17, 1861.

My Dear Sir,—An association has been formed in London for the purpose of establishing a weekly magazine of high character, to be devoted to gas, water, and sanitary subjects.

One great object is, to have a fair and full representation of all these important interests alike, as regards producers, consumers, local authorities, and others.

We hope by a fair and upright advocacy of everything meritorious in these departments, to counteract the debasing influence now exercised by a certain journal, which is constantly endeavouring, amongst other things, to depreciate all professional men not belonging to its own clique; and perpetually imputing to them unworthy and improper motives.

The expense of establishing the magazine will probably be about £2000, which it is proposed to raise by a sort of joint-stock limited liability.

There is to be a meeting on the subject at two p.m., on Tuesday, the 25th of June, at the office of Messrs. Marriott and Jordan, parliamentary agents, 22, Parliament Street, when I shall be very happy if you can attend. If this be not possible, will you kindly communicate with me in the course of this week, saying whether you feel disposed to take any interest, of a pecuniary nature or otherwise, in this matter? If you do not wish to become a shareholder, I hope we may, at all events, rely on your support in the way of contributing articles.

I remain, dear Sir, yours very truly,
(Signed) SAMUEL HUGHES.

Messrs. Marriott and Jordan, the gentlemen under whose auspices this project has been concocted, are well known to be the agents of Messrs. Glover, and of the other parties who are endeavouring to defeat the amendment of the Sale of Gas Act; and, it may be inferred from the circular, that a league has been formed between that party and Mr. Hughes for mutual purposes. Who the other parties invited to join the conference may be, we shall perhaps learn in time. Some of them, indeed, might be pointed out by inference, for the meeting would assuredly have been incomplete without the presence of Mr. Flintoff, the founder of the school of which Mr. Hughes is a recent *élève*. He is an old client of Mr. Marriott, who canvassed not long ago in his behalf when he was a candidate for a public appointment, and his previous literary renown would render him a fitting associate in such an undertaking. He can also point to the almost fabulous savings he claims to have been the means of effecting in a long array of towns, while his pupil's chief claim upon the gratitude of his metropolitan friends consists in a rise of 10 per cent. in the price of gas to the private consumer in the eastern districts, and an increase in the charge for public lights in other districts; for those have been the substantial results of the metropolitan gas agitation, in which Mr. Hughes played so important a part.

The circular we have printed was not addressed to us; and, not having been invited to attend the meeting, we have no positive knowledge of what was said and done; but, it may be safely assumed that we were honoured with special notice, and that our "clique," comprising all the respectable portion of the engineering profession, came in for their share of comment.

The "great object" which the Hughes and Glover "cliques" profess to have in view is, as we have seen, to be accomplished by raising £2000 "by a sort of joint-stock limited liability." The exact kind of liability which the shareholders would have to incur does not seem to be settled, and it will require all Mr. Hughes's ingenuity to devise "a sort of limited liability" that will protect them from actions for libel, and the other responsibilities that the proprietors of a public journal have to bear beyond the ordinary risks of a trading company. The minor consideration of personal risk may, however, be regarded as insignificant when the object to be gained is "a fair and upright advocacy of everything meritorious;" and, could we feel assured that that object would be accomplished, we might, perhaps, be induced to take shares in the undertaking. Though Mr. Hughes professes to be angry and at enmity with us, the project may be intended for our benefit, as experience has proved that two may thrive where one has starved; and we are old enough to remember how rivalry increased our usefulness, and strengthened our hands. Can it be that Mr. Hughes intends, in this way, to repay the obligations he is under to us for having so frequently advertised him gratuitously? Should that be his motive, it is an ungracious act to use Messrs. Glover and Co. as his cat's-paw, and to make them pay the expense. The advantage to be gained by a short-lived attempt to maintain the Sale of Gas Act can scarcely be worth sinking £2000, under any circumstances; and it is quite certain that, if the proposed magazine did really carry out the profession of "a fair and upright advocacy of everything meritorious," those who are now most desirous to establish such a periodical, would be quite as much incensed by its observations as they are with "a certain journal" under whose lash they writhe.

Circular to Gas Companies.

A PARLIAMENTARY return, occupying fourteen pages, has been issued, which professes to be a "copy of all reports made since the 11th of February, 1860, to the Treasury, or to the Comptroller-General of the Exchequer, by the Astronomer-Royal, relative to the steps which have been taking for giving effect to the Sale of Gas Act." These "reports" contain little of which we have not already informed our readers. They comprise twelve letters to Mr. Hamilton, the Secretary to the Treasury, and three to Lord Monteagle, the last one being dated the 24th of April, 1861. The early letters refer to the preparation of the model cubic foot, and gas-"measurers," and to the objections raised by the meter makers to the Astronomer-Royal's interpretation of the Act. On the 2nd of October, he repeated his original opinion, that there can be no assurance of accuracy in the use of the copies of the gasholders tested at the Exchequer Office, unless an itinerant officer inspect the instruments on the spot. It appears from a letter of the 29th of the same month, that some misunderstanding had arisen as to the construction of the model instruments to be sent to Edinburgh and Dublin, and that, at the time the Astronomer-Royal was writing to the Treasury for instructions about the matter, the order for making them in the same costly manner as those for the Exchequer Office, had been already given by Mr. George Glover, without any direct authority. On the 28th of December, the Astronomer-Royal reported that the standard "gas-measurers,"—for he persists in calling them by that name—of one, five and of ten feet had been deposited at the Exchequer Office, and that he had himself compared them with the standard cubic foot. The result of the examination is stated to be, that the 5-feet "measurer" exhibited no trace of error, that the 10-feet instrument, according to the peculiar phraseology of the Astronomer-Royal, "appeared to show an error of about $\frac{1}{1000}$ part, which appeared to be undoubtedly due to a little change of temperature;" and that the 1-foot instrument, which is extremely sensitive to such changes, "apparently exhibited errors, sometimes $+\frac{1}{300}$, sometimes $-\frac{1}{300}$." He, therefore, reported all the gasholders as being to all intents and purposes perfect. The Astronomer-Royal stated in that letter his reason for not employing any meter manufacturer to construct the standard instruments, and that he selected Messrs. Donkin to do the work, under the superintendence of Mr. George Glover, whom he takes occasion to laud; and, in the conclusion of his report, he expresses his conviction "that the instruments applying to the measure of gas with which the Exchequer is now furnished are entirely fitted to maintain the character of our national standard." On the 14th of January, the Astronomer-Royal wrote to Lord Monteagle, to transfer the charge of the instruments to his lordship, to whom Mr. G. Glover was commissioned to deliver the key of the apartment in which they were deposited. In a letter to Mr. Hamilton, on the 24th of the same month, there was enclosed a "draft of provisional instructions for the verification of gasholders (gas-

measurers)," with a recommendation that the office should "for the present" be placed under the general charge of Mr. G. Glover. In the instructions, a tolerance of $\frac{1}{1000}$ part of error is admitted; but, in a note, it is suggested that the tolerance should be extended to $\frac{1}{500}$ and in a subsequent letter, dated the 19th of April, it is proposed that it should be $\frac{1}{200}$ part, or $\frac{1}{2}$ per cent. In a letter to Lord Monteagle, dated the 26th of February, there was enclosed a table representing the dilatation of gas when saturated with aqueous vapour, for given temperatures; and the "reports" conclude with another letter to his lordship, containing "supplementary instructions for the examination of gas-measurers," and in which the Astronomer-Royal asks to be "entirely relieved from further attention to the business of gas-measurers." As reasons for this request, he states that the good order of the Observatory, and his personal comfort, have suffered materially from his unassisted attention to the business.

It is quite clear, from what has been published, that there are many documents, connected with the subject, which have been withheld. No explanation, for instance, is given of the object for which a gasholder, graduated at the Exchequer, has been deposited at the office of Messrs. Marriott and Jordan, the parliamentary agents. The Exchequer authorities are only authorized, by the Sale of Gas Act, to test and verify the gasholders required for the use of inspectors of meters; therefore, special permission would have been required to graduate the meter which we are informed has been lodged at Messrs. Marriott and Jordan's, but no notice of the grant of such permission appears in these reports. It may be that Mr. G. Glover has exceeded his authority, as he did in ordering the model gasholders for Dublin and Edinburgh, by directing the verified gasholder to be sent to his solicitor's; or it may have been diverted, by some underhand means, from its legitimate destination; but, in the absence of any official report on the subject, we are left to conjecture what can be the possible use of such a gasholder in an attorney's office.

The meter manufacturers of the metropolis are making strenuous exertions to induce the magistrates of Middlesex and Surrey to appoint inspectors, in accordance with the provisions of the Act; so that, before the day arrives beyond which no unstamped meter can be legally fixed, there may be officers ready to do the work of testing and stamping, which will then be essential, not only to the meter makers and the gas companies, but to the consumers of gas. At the meetings, last week, of the vestries of Newington, Lambeth, and St. George-the-Martyr, resolutions were carried, after much opposition, to memorialize the Surrey magistrates to appoint an inspector or inspectors for that county. The magistrates seem still disinclined to move in the matter; and we are informed that an intimation has been made to them that, should they refuse, at the next quarter sessions, to appoint the requisite number of officers to put the Act in effective operation, a short bill will be probably passed, during the present session, either to compel them to do so, or to authorize some other body to make the necessary appointments. We trust, however, that, when they perceive the great inconvenience that would be occasioned by the want of stamped meters, they will no longer hesitate to do what public necessity requires.

Whilst the magistrates of the counties of Middlesex and Surrey hesitate about the appointment of inspectors of meters, from the apprehension that it might create a charge on the county rates, some of the magistrates of boroughs in the north, though recognizing the necessity of appointing inspectors, are endeavouring to save the amount of their salaries by imposing on them other duties than those enjoined by the Sale of Gas Act. We alluded, in our last number, to the inconvenience which had been experienced in Sheffield, from the town council having required their meter inspector to test the quality of the gas, though only for a time; but the gas committee of the borough of Greenock carry their views of economy so far that they would impose on the inspector of meters, to whom they proposed to give a salary of £100, several permanent duties, each of which would require a separate responsible officer to discharge efficiently. They proposed that he should daily test, by photometer and bromine, the quality of the gas, and make reports thereon; that he should personally test and report as to the public and private lamps, the pressure and the quantity of gas consumed per hour, by each description of burner, during four parts of the night; that he should call each day, Sunday included, at the gas-works, and leave notice in writing of the number of lamps to be lighted, and the hours they were to be lighted and extinguished; that he should call each "lawful day" at the police office, to inquire if any of the public lamps were observed burning improperly during the night, and, if so, that he should not only record the fact, but take immediate steps to get the matter rectified; that he should see to the public lamps being properly supplied and kept in good order, and cleaned at regularly stated intervals (it does not distinctly appear that he was to clean them himself); and, having discharged those duties, the inspector was required to fill up his time by checking the accounts rendered for public lamps; and, in case they were correct, he was to certify that the quantity of gas charged corresponded with the quantity consumed, and, if not correct, he was to certify the true quantity that ought to be paid for. If the Greenock water trust, which body assumes to have the power of appointing the meter inspector, could get that officer to discharge those various duties for £100 per annum, they would assuredly have no reason to complain of the cost of carrying the Sale of Gas Act into operation. The Provost, however, objected to the interference of the inspector with the lighting of the public lamps, as it would be likely to bring him into collision with the manager of the gas-works, and on that account the report of the gas committee was sent back for reconsideration. When the report was presented, no one appeared to object to the amount of work thrown on the meter inspector, in addition to the discharge of his proper duties. When, indeed, it is known that only one inspector has been appointed for the whole of the metropolitan district, there is some ground for the notion that, in a small provincial town, the duties of the office must be very trifling; and their importance and onerous nature will not be adequately appreciated until the Act comes into full operation.

Notice has been given for the insertion of a clause in the Highway Bill now before Parliament, which, if passed in the form in which the notice is given, may lead to complications which it is desirable to prevent; and its mover will, we apprehend, consent, upon a proper representation being made to him, to such a modification as will limit its operation to the *bonâ fide* purposes for which it is sought to be introduced. The notice given is to the following effect:—

> Where the owner, lessee, or occupier, from time to time, of any lands, minerals, or easements on both sides of any highway, shall be desirous of breaking up such highway for the purpose of carrying or constructing any pipe, culvert, or tunnel across and under the same from the lands on the same side thereof to the lands on the other side thereof, or for the purpose of maintaining or amending such pipe, culvert, or tunnel, and shall give fourteen days notice of such his desire to the highway board of the district in which such highway is comprised, it shall be lawful for him, at his own expense in all things, and under the direction and to the satisfaction of the surveyor for the time being of the highway board, to break up and restore such highway for the purposes aforesaid; and if such owner, lessee, or occupier shall neglect to restore such highway to the satisfaction of the surveyor, it shall be lawful for the surveyor forthwith to restore and make good the same, and the cost thereof shall be a debt recoverable by the surveyor from such owner, lessee, or occupier, in any court of competent jurisdiction.

Thursday next is the day named for the consideration of the bill in committee, and we would suggest the addition of a proviso for the protection of the pipes of gas and water companies, and that the right acquired by any owner, lessee, or occupier of any land, minerals, or easements shall be used only for the convenient use or working thereof.

The bill promoted by the corporation of Bolton has been stopped in the House of Lords, so far as it relates to the purchase of the gas-works in that town, the Wharncliffe standing order requiring the assent of the gas company to the arrangement, which assent they refused to give, although tempted by an offer of 24¼ years purchase on the maximum dividend which their Act permits them to distribute. On the other hand, the Macclesfield Gas Company has accepted 25 years purchase from the local board of that town, and has withdrawn the bill it was promoting in the present session, and which had passed the Lords.

The Commercial Gas Company have issued notices that the price of gas will, at Midsummer, be raised in the district supplied by them (the eastern section of the metropolis), from 4s. to 4s. 5d., per 1000 feet. The Act of last session put an end to the contracts by which the company was bound to supply gas on the same terms as the Great Central Company, and its shareholders will, henceforward, receive dividends commensurate with the risk they incur in the performance of an important public service. Indeed, all the metropolitan companies may now look forward to the prescribed dividends being regularly paid; and the premium of from £7. 10s. to £8 per share realized, by the sale by auction, of the 437 new shares of the Equitable Company, on Wednesday last, is proof of the

favourable opinion entertained by the public of this class of undertakings.

The actions brought by Mr. Morley, and Messrs. Sturgeon and Co. against the Great Central Company, for damages caused by the Wood Street fire, are fixed for this day, at Guildhall, and will last several days, as the witnesses to be examined on both sides are far more numerous than upon the former occasion.

Mr. Flintoff's twopenny meeting at Kirkcaldy was by no means a brilliant success. No ladies accepted his invitation to occupy the seats reserved for them, and the number of twopences received was not sufficient to be remunerative. The proceedings were much less animated than at Musselburgh, and Mr. Flintoff's speech, if the report of it in the local paper be correct, abounded in the most ludicrous absurdities. His estimate of the cost of making 15 millions cubic feet of gas per annum must, however, be authentic, for it was given by himself to the reporters, and one item will serve as a specimen of the whole. All salaries, including those of directors, manager, clerks, collector, and assistants, are estimated to amount to £100 per annum! If time and labour be so cheap in Scotland, we need not be surprised that the Greenock gas committee should require their meter inspector to do his own work and that of three or four other officers for the same annual sum.

Register of New Patents.

2836.—Henry Alfred Jowett, C.E., of Sawley, in the co. of Derby, for "*Improvements in the method of heating or firing ovens for the manufacture of pottery and porcelain by means of gas, and in apparatus connected therewith.*" Provisional protection only obtained. Dated Nov. 19, 1860.

By the above title, it will be readily comprehended that gas is the agent to be substituted in place of the present firing system adopted by manufacturers of the above wares; but it must always be distinctly understood that of whatever nature the gas may be, it will not, in its natural state of combustion, yield sufficient or adequate heat for achieving the desideratum in question without the united aid of atmospheric air and steam in combination with the gas, the gas being the inflammable body, the air supplying a sufficiency of oxygen for the support of its combustion in confined ovens, and the steam being added to increase the heat to the intensity of the blow-pipe, and diffuse it equally, but in one volume, instead of concentrating it at one point, as in the case of the blow-pipe.

The construction of the burner by which the gas air, and steam, are employed in combination will entirely depend upon the shape of the oven in which the saggers or retorts containing the china or the earthenware articles for firing, are to be placed; but, by way of example, without rigidly binding himself to the precise method herein set forth, the patentee claims first—the construction of a hollow fire-clay brick, with separate compartments for the introduction therein of the three agents to be combined for producing an intensity of heat.

On one side of the hollow brick is attached, in moulding the same, a fire-clay tube, of 2 inches diameter, and 6 inches in length, at an angle of 45°, the end which is moulded being in the upper compartment for gas, and the lower one being for the admission of the air and steam by a transverse division in the lower compartment of the brick. These solid bricks and hollow brick burners will be built in the oven as bricks are now built—that is to say, in a round oven, the first layer or circle will be a solid brick, built on the stock or foundation bricks; the second layer will be the hollow or burner brick; the third layer the solid brick laid upon the burner brick and so on alternately, until the conical oven is considered of sufficient height, and by a series of pipes, uniting each and every hollow brick externally by short pieces of tube from the upright pipes, the lower ends of the latter are inserted into a circular hollow casting, which is made in two halves, and bolted together by flanges and traversing externally and entirely around the circular oven. This casting is the receptacle for the inflammable gas, which is supplied by a main-pipe direct from the gasometer, and which can be regulated by a main stop-cock. The upright pipes are closed at the top, so that the gas passes over them through the short connecting-pipe into the upper compartment of the brick, and from thence igniting in the interior of the oven upon the fire-clay tube, which is moulded on the hollow brick of the oven, the gas, air, or steam will be admitted, and perfect combustion effected in the interior of the oven, and regulated to the greatest nicety from the exterior. Should it be found necessary to increase the heat more than the present plan described will give, the solid bricks may be dispensed with, and hollow-burner bricks substituted, and a hollow column of fire-clay in the centre of the oven, with burners all round it from the base to the height of the other burners; this column to be supplied with gas, air, and steam, by pipes or flues underneath the floor of the oven.

2982.—Charles William Siemens, of 3, Great George Street, Westminster, for "*Improvements in fluid meters.*" Patent dated Dec. 5, 1860.

This invention has reference to the class of high-pressure fluid-meters acting by impact of water upon rotating wheels, with helical, spiral, or other blades or projections, or by reaction in issuing from orifices at the circumference of rotating wheels; for meters of which class the patentee obtained letters-patent, dated April 15, 1852, No. 14,060, and further letters-patent, in his own name and that of Joseph Adamson, dated March 24, 1853, No. 712, and other letters-patent, in his own name, dated November 29, 1856, No. 2824.

The patentee claims—first, the construction of fluid-meters, wherein the fluid to be measured, when passing in small quantities through the same, is caused to flow through fixed contracted channels, and is by these directed in oblique jets against the surface of the measuring-drum, or against the fans or projections on the same, in the direction of its intended motion—thus imparting considerable additional rotative power to the drum, and enabling it to overcome the friction of the moving parts, when the quantity of fluid passing through the meter is so small as not to be able to move the drum when only acting upon the same in the ordinary manner, but which oblique jets are caused to die away, and become inappreciable in their effect, in proportion as the flow of the liquid through the meter increases.

The invention consists—secondly, in imparting reciprocating motion, in the direction of the axes, to the drums of fluid-meters, by the variations in the hydrostatic pressure, caused by jets being made to act in an intermittent manner.

Thirdly, the construction of high-pressure fluid-meters, wherein variable jets or contracted streams are directed over the surface of the measuring-wheel or drum, or against the fans or minute projections on the same, in the direction of its intended motion, so as to impinge against the same with considerable energy when the quantity of fluid passing through the meter is comparatively small, and which jets or contracted streams lose part of their energy to impart a rotary motion to the drum as the flow of the fluid increases, so as to produce a rate of rotation proportionate, under all circumstances, to the quantity of fluid flowing through the meter.

Fourthly, recording the motion of a rotating drum, measuring the flow of water or the rapidity of its own motion through the water, by means of electric currents, which, being interrupted and re-established at intervals by the rotary motion of the drum, causes each time an armature to be attracted by an electro-magnet, and a hand or hands to be moved, recording the revolutions of the drum.

3023.—Joseph Antoine Barde, of Paris, gentleman, for "*An improved portable apparatus for producing and purifying lighting gas.*" Patent dated Dec. 10, 1860.

The invention relates to an improved portable apparatus for manufacturing and purifying illuminating gas, the purifier forming a small gasometer, which may be put up in the interior of houses, say a room, kitchen, workshop, or other similar place, the evolution of the gas taking place in the same room, or in close proximity to the gasometer.

3064.—William Clarke, of 53, Chancery Lane, London, for "*Improvements in the manufacture of gas.*" A communication from M. Heber Marini, of Paris. Provisional protection only obtained. Dated Dec. 13, 1860.

This invention relates to the introduction into retorts during the distillation of coal of a large amount of hydrogen gas, pure or nearly so, of little lighting power, and previously manufactured and stored in suitable gasholders, in which it is received without any purification. It is heated by the waste heat of the furnace, before it enters the retorts. The gas is intended to act on the carburetted vapours evolved in the retort, and to combine with the lighting gas. It will, at the same time, protect the olefiant gas from the contact of red-hot parts of the retort—first, by its interposition, and afterwards, by the impulsive force it gives to the products of distillation, which will be expelled very rapidly from the retort, without producing either pressure or vacuum. It is easily understood that, by this new manufacture, the best products of distillation may be rapidly withdrawn by means of exhausting apparatus, without fear of withdrawing the oxygen of the air, or of producing a vacuum in the retort, for this reason, that the reserve hydrogen gasholder will always compensate for the exhaustion, whatever be its power.

This invention also affords means of extracting rapidly the first and richest products of the distillation augmented by the poor gas, which it will enrich.

Gases of bad quality, the product of a preceding distillation, can, without inconvenience or loss, be returned to the reserve gasholder, whence they can pass to be enriched by a subsequent process of distillation.

3066.—Frederick John Evans, of the Gas-Works, Horseferry Road, Westminster, and George Frederick Evans, of the Gas-Works, Brentford, engineer, for "*Improvements in the manufacture of illuminating gas.* Provisional protection only obtained. Dated Dec. 13, 1860.

This invention relates firstly, to the purifying of coal-gas after condensation, and previously to its undergoing the ordinary purification by mixing with the foul gas, atmospheric air, or pure oxygen, and then heating the gas to a temperature, varying according to circumstances, of from 200° to 400° Fahr.; and, while in this heated state, passing the same through a purifier or other convenient vessel, containing charcoal, coke, asbestos, chalk-asbestos, and spongy platinum, or other equivalent substances, previously heated to the temperature above-mentioned. During the passage of the gas through the heated purifier, the sulphur compounds in the gas appear to be decomposed, and sulphurous or sulphuric acid is produced, and which combines with the ammonia existing in the gas, or may be passed through a solution of gas liquor, so as to be absorbed. By this method, the gas is wholly or in great part deprived of its sulphur compounds; and, if thought desirable, it may be further subjected to any of the known modes of purification.

Any convenient form of purifying apparatus may be used for the purpose of this invention; but, it is preferred that the source of heat to be applied thereto shall be the waste heat from the retort-ovens, whether it be applied directly or through the medium of steam produced by such waste heat.

To determine what substances are suitable for use in the purifier, the gas, mixed with air or oxygen, is to be passed through a tube containing the material to be tested; and if the gas, on issuing from the end of the tube, shows that it is free from sulphuretted hydrogen, such material may be pronounced effective.

This invention relates, secondly, to the freeing from its sulphur compounds gas that has already undergone the process of purification, and which is known as pure gas. For this purpose, the same means are used as that above-described for treating foul gas; and, in some cases, it is pro-

posed to dispense with the use of the atmospheric air or oxygen, as above-mentioned.

3087.—JOHN GRIFFITH WILLIAMS, of Blaenavon, in the co. of Monmouth, gas proprietor, for "*Improvements in extracting inflammable and other noxious gases from coal and other mines.*" Patent dated Dec. 15, 1860.

This invention relates to a peculiar system or mode of extracting inflammable and other noxious gases from the workings of coal and other mines, whereby the danger arising from explosions and the presence of the gases known as "fire-damp" and "choke-damp" may be obviated.

According to this invention, it is proposed to convey a ramification of pipes into the several workings of the mine, and to connect such pipes with suitable appliances for exhausting or extracting, by machinery or otherwise, the gases from the said workings. The gases so exhausted or extracted from the mine may be either discharged into the atmosphere or consumed.

When it is desired to extract the light and inflammable gases from the "goafs" or workings, ascending branch-pipes are fitted into the main-pipes, such branch-pipes rising to the top of the goafs or cavities in the upper parts of the working, so as to be surrounded by the gas which may collect in such cavities; but, when choke-damp or carbonic acid gas, which is much heavier than air, is to be extracted, the branch-pipes should descend down to the lowest part of the workings, when the gas may be extracted by any suitable arrangement of pumps.

3161.—FRANCIS PULS, of 25, Francis Terrace, Hackney Wick, in the co. of Middlesex, chemist, for "*Improvements in obtaining products from coal, gas-tar, gas-pitch, coal-tar, asphalte, resin, and other bituminous and resinous substances.*" Patent dated Dec. 26, 1860.

This invention consists of a mode of obtaining products from coal, gas-tar, gas-pitch, coal-tar, asphalte, resin, and other bituminous and resinous substances. For the purpose of obtaining products from these materials, they are mixed with a mineral acid, or mineral acids, or other oxidizing chemical agent, and the mixture is then subjected to distillation in the usual or any convenient manner. If the material to be operated upon is solid (such, for example as pitch, coal, or asphalte), it may be first broken into powder or small pieces. It is preferred to use sulphuric acid, as the oxidizing agent, by reason of its cheapness; but, any agent which is sufficiently cheap and will impart sufficient oxygen to the material to be operated upon during the process of distillation, may be used. If the oxidizing agent be a fluid, such as sulphuric acid, it is preferred to mix it with powdered charcoal, or some other powder which will not neutralize its effect, before adding it to the bituminous or resinous substance to be operated upon. A fluid oxidizing agent is mixed with powder for the purpose of insuring a more even distribution or mixture of it amongst the particles of the bituminous or resinous material. The quantity or proportion of the oxidizing agent to be employed must depend to a considerable extent upon the nature of the material to be operated upon, and the description of the product or products which the operator may desire to obtain. Thus, the larger the proportion of the carbon to the oxygen in the hydrocarbons contained in the material, the greater must be the quantity of the sulphuric acid, or other oxidizing agent, employed in the operation. If the material to be operated upon shall happen to contain any element or elements which will neutralize, or render inoperative, any portion of the sulphuric acid, or other oxidizing agent, the quantity of the acid or other agent employed, must be proportionably increased, or the obnoxious element must be got rid of or its effects prevented. The lighter the quality of the products which may be desired, the larger must be the quantity of sulphuric acid or other oxidizing agent employed; and, when products of a heavier description are desired, the quantity of acid or other oxidizing agent must be proportionably diminished.

In operating upon gas-pitch in order to obtain a product which shall contain a heavy hydrocarbon, or mixture of hydrocarbons, about the consistency of lard, but heavier, the pitch should be mixed with 2 per cent. of sulphuric acid of the ordinary commercial strength (say about 1·8). If a larger quantity of acid be used, oils or products of a lighter description will be obtained; and the quantity of the acid may be increased for altering the nature of the products in this way, up to about 6 per cent., above which quantity the effect of the acid would be injurious.

The quantity of the acid to be used in operating upon gas-tar for obtaining products in the same way, varies from about 2 to about 8 or 9 per cent.; and, if the tar contains much naphthaline, the quantity of acid may be increased up to about 12 per cent., if the object be to obtain products of a light description.

In operating upon cannel coal, from about 3 to 6 per cent. of acid may be used. Asphalte and Trinidad pitch contain varying proportions of earthy matters; and, in operating upon them, from 3 to 12 per cent., or even more, of the acid may be used. From 3 to 4 per cent. of acid may be used in operating upon coal-tar, and from 1½ to 2 per cent. in operating upon resin.

These various proportions of acid are mentioned in order to give the best information, subject to the general observations above-named, respecting the quantity of acid or other oxidizing agent to be used; and also this further observation, that the quality of the several matters which have been mentioned will be found to vary considerably; and, therefore, it is necessary to attend to the observations respecting the quantity or proportion of the oxidizing agent to be employed in operating upon any material.

The mixture of materials to be operated upon with the intended quantity of sulphuric acid, or other oxidizing agent, is introduced into an earthen retort, or into a convenient retort of any description which will sufficiently resist the action of the fire, and the materials to be subject to distillation. Heat is then applied until all the products which can be distilled, or driven out of the mixture in the state of vapour, shall have been driven out of it, and condensed and obtained in some convenient condenser or condensers connected with the retorts. Heat may be applied to the retort externally by means of a fire below it, or in any convenient way, and the temperature may be raised gradually up to about a low-red heat. But it is preferred to effect the distillation by means of superheated steam, introduced into the retorts by pipes or other apparatus, by means of which the steam, and consequently the heat, get equally distributed, and applied throughout the whole of the mass to be subjected to the process of distillation. The apparatus for effecting distillation by means of steam is well known; and, as the apparatus to be employed forms no part of the invention, it need not here be described. The steam must, however, be heated or superheated to the extent which may be necessary to effect the distillation, gradually raising the temperature as before-mentioned. The materials treated in this manner being heated in the retort with the acid, or other oxidizing agent, in manner above-mentioned, an effect which is deemed to be oxidization is produced, and the volatile products are evolved and distilled. The nature or quality of the volatile products thus obtained will vary as the distillation progresses; and, therefore, it may be convenient to change the receiver, from time to time during the process, when the nature of the products condensed in the receiver shall be found to be changed. By the use of this mode of treating the materials above-mentioned, products are obtained from them with greater facility, and in greater quantities, without performing any separate process for oxidizing or purifying those products; and, at the same time, the process of treating them with acid, and washing the products after distilling them, is dispensed with.

The claim is for the mode of obtaining bituminous and resinous substances, by subjecting them to the action of an acid, or other oxidizing agent; and, at the same time, to the process of distillation, as above-described.

3162.—CHARLES LIZARS, of 36, Rue Lafayette, Paris, manufacturer of gas-meters, for "*Improvements in gas-meters.*" Patent dated Dec. 26, 1860.

This invention has for its object improvements in gas-meters. Heretofore, in gas-meters, various means have been employed for supplying water continuously to the measuring-compartment, so as to maintain the water at the proper working level; and the apparatus for this purpose has been actuated by the meter itself, the working of the meter thus producing a continuous supply of water to the measuring-compartment. Such arrangements are, however, objectionable, as the labour is thrown on the measuring parts of the meter, which should work as freely as possible.

Now, according to this invention, the apparatus for supplying water to the measuring-compartment is actuated by the cock by which the gas is turned on and off. There is a rod attached by a screw to a plug of the said cock, and the rod descends into the meter through a tube, which, at its lower end, is sealed by dipping into the water in the meter. The rod gives motion to a lever, at the end of which is a curved rack, and this gears with a pinion, so that, each time the cock is opened or closed, the pinion rotates. On this axis a scoop is fixed, which, rotating with the pinion, raises water from a reservoir, and pours it into the measuring-compartment. Or, in place of mounting a curved rack on the end of the lever, and a pinion on the axis of the scoop, the end of the lever may be made to act on a projection on the scoop, so as to give it the required motion, or the supply apparatus may be worked by hand, if preferred.

3179.—CHRISTOPHER BINKS, of Parliament Street, Westminster, for "*Improvements in manufacturing certain gases applicable in generating heat and light, and in bleaching.*" Provisional protection only obtained. Dated Dec. 26, 1860.

The object of this invention is the economical manufacture of chlorine and oxygen, and, as regards the chlorine, it consists in effecting the decomposition of hydrochloric acid through the agency of oxygen gas mixed with, or brought in contact with, the hydrochloric acid—preferably under the joint action of a high temperature and the presence of any substance or substances capable of retaining or of fixing by combination, or otherwise, the water formed by the reaction between the oxygen and the hydrogen of the hydrochloric acid, but not capable of retaining or of fixing the chlorine, which is thus liberated in its gaseous form.

The invention, as regards the production of oxygen, consists—first, in effecting the decomposition of water, free or combined, or in its ordinary form, or in that of steam, or of steam superheated, or otherwise, through the agency of chlorine, mixed with, or brought in contact with, the water or the steam, under (preferably) the joint action of a high temperature, and the presence of any substance or substances capable of retaining or of fixing by combination or otherwise the hydrochloric acid, formed by the reaction between the hydrogen of the water and the chlorine, but not capable of retaining or of fixing the oxygen which is thus set free in its gaseous form. Secondly, it consists in manufacturing oxygen by exposing oxides of manganese, preferably the sesqui and the peroxide, to the action of chlorine, and preferably, aiding the reactions between these by means of heat, applied either to the oxide or the chlorine, or to both, thereby forming chloride of manganese, and setting free in its gaseous form the combined oxygen of the oxides. The residual chloride of manganese can then be treated for re-oxidization of its metal by methods for that purpose, secured to the inventor by letters patent of May 19, 1860.

APPLICATIONS FOR LETTERS PATENT.

1528.—JOHN SUMMERSCALES, of Keighley, York, machine maker, and MARK MASON, of Manchester, Lancaster, engineer, for "*Improvements in gas-singeing apparatus.*" June 14, 1861.

1570.—JOHN DIXON, of Gallowgate Works, Newcastle-on-Tyne, for "*Improvements in water-closets, and cocks used therewith.*" June 18, 1861.

1581.—WILLIAM JAMES HARRIS, of Liverpool, for "*Improvements in dry gas-meters.*" A communication. June 19, 1861.

1586.—MICHEL FRANÇOIS ANTOINE THIBAULT DE MENONVILLE, of 42, Rue Laffitte, Paris, France, manufacturer, for "*A new system of condensing and ventilating.*" June 20, 1861.

1610.—ROBERT RUSSELL, brass-founder, of Sheffield, York, for "*An improved valve to regulate the passage of fluids.*" June 22, 1861.

1629.—STEPHEN WENTON, of Lower Rosoman Street, Clerkenwell, Middlesex, for "*Improvements in ventilating apparatus.*" June 26, 1861.

1631.—JOHN REDFERN, of Hanley, Stafford, for "*Improved apparatus for raising the temperature of air in order to warm churches, conservatories, houses, and other buildings or places.*" June 26, 1861.

1636.—Henry Coulter, of Philadelphia, United States, for "*Improvements in lamps specially intended to burn oils, and other inflammable fluids rich in carbon.*" June 26, 1861.

1642.—Marc Antoine François Mennons, of the British and Foreign Patent Offices, 39, Rue de l'Echiquier, Paris, France, for "*Improvements in cocks or taps for drawing off liquids, and in gauging apparatus connected therewith.*" A communication. June 26, 1861.

1645.—Henry Hamer, of Horsforth, York, paper manufacturer, for "*Improvements in chimney-tops and ventilators.*" June 27, 1861.

GRANTS OF PROVISIONAL PROTECTION.

1316.—Frederick Hahn Dauchell, of Red Lion Square, Middlesex, for "*Certain improved methods of, and apparatus for, ascertaining and removing impurities contained in water.*" May 24, 1861.

1397.—Alexander Prince, of Patent Office, 4, Trafalgar Square, Charing Cross, Middlesex, for "*Improvements in the manufacture of gas, and in apparatus connected therewith.*" A communication. June 4, 1861.

1419.—John Bailey and William Henry Bailey, of Albion Works, Salford, Manchester, Lancaster, turret-clockmakers, for "*Improvements in apparatus for indicating the speed, flow, pressure, and vacuum of liquids, and other bodies.*" June 6, 1861.

1446.—Samuel Bennett the younger, of Handsworth, Stafford, coke, coal, and iron dealer, for "*An improvement or improvements in utilizing waste or defective pieces of tubing made of iron, or other metal or metallic alloy.*" June 7, 1861.

1448.—Alexander Angus Croll, of Coleman Street, London, engineer, for "*Improvements in the manufacture of sulphate of alumina.*" June 7, 1861.

1453.—John Farrand Clarke, of 26, Moorgate Street, London, gas and steam engineer, for "*Improvements in apparatus for regulating the supply of fluids.*" June 7, 1861.

1497.—Charles Chalmers, of Edinburgh, Midlothian, N.B., gentleman, for "*Improvements in gas-stoves.*" June 11, 1861.

1528.—John Summerscales, of Keighley, York, machine maker, and Mark Mason, of Manchester, Lancaster, engineer, for "*Improvements in gas-singeing apparatus.*" June 14, 1861.

NOTICES TO PROCEED.

392.—James Horn, of Whitechapel, High Street, Middlesex, engineer, for "*Improvements in machinery or apparatus for the manufacture of bituminized paper pipes, and other similar articles.*" Feb. 16, 1861.

707.—Marc Antoine François Mennons, of the British and Foreign Patent Offices, 39, Rue de l'Echiquier, Paris, France, for "*Improve- in gas stop-cocks.*" A communication. March 21, 1861.

897.—William Edward Newton, of the Patent Office, 66, Chancery Lane, Middlesex, for "*Improvements in pressure gauges.*" A communication. April 11, 1861.

979.—James Pinchbeck, of 35, Whiskin Street, Clerkenwell, Middlesex, gas-meter manufacturer, for "*Improvements in wet gas-meters.*" April 20, 1861.

Parliamentary Intelligence.

HOUSE OF LORDS.

June 17, 1861.

The Burton-upon-Trent Water Bill was returned from the Commons, with the amendments agreed to.

June 18.

The Kingstown Water Bill was read a second time, and committed.

June 21.

Bolton Corporation Bill.—The Bill, together with the Examiners' certificate relating thereto, was refered to the Standing Orders committee.

The Kingstown Water Bill was reported, without amendment.

The Stockport District Water Bill was read a second time, and committed.

June 25.

The Leigh District Gas Bill was returned from the Commons, agreed to, with amendments. The said amendments were considered, and agreed to.

The Portsea Gas Bill was returned from the Commons, agreed to, with amendments.

The Dublin Corporation Water Bill was read a second time, and committed.

The Kingstown Water Bill was read a third time, and passed.

June 27.

The Dublin Corporation Water, and the Stockport District Water Bills, were referred to a select committee, consisting of Lord Llanover (chairman), Earl Spencer, Lord Sheffield, Lord Raglan, and Lord Aveland, who will sit on Tuesday, July 2, at eleven o'clock.

June 28.

The following Bills received the Royal assent:—The Darlington Local Board of Health, the Dewsbury and Batley Gas, the Sowerby Bridge Gas, the Whitworth Vale Gas, the Leigh District Gas, and the Kingstown Water Bills.

The Portsea Gas Bill.—The Commons amendments were considered, and agreed to.

The Weston-super-Mare Gas Bill was returned from the Commons, agreed to.

The Grand Junction Water Bill was returned from the Commons, agreed to, with an amendment.

The Bolton Corporation Bill.—The Standing Orders committee report, that the Standing Order not complied with ought to be dispensed with, and the Bill allowed to proceed, provided that the powers conferred on the Bolton Gas Company to transfer their gas-works to the corporation be struck out of the Bill.

HOUSE OF COMMONS.

June 17.

The Whitworth Vale Gas Bill was reported, without amendment, and ordered to be read a third time.

The Grand Junction Water Bill was reported, with an amendment.

The Leigh District Gas Bill, as amended, was considered, and ordered to be read a third time.

Two petitions were presented against the Highways Bill, and one against the Parochial Assessments Bill.

A message was received from the Lords, intimating that they had agreed to the Dewsbury and Batley Gas Bill, without amendment; and the Middleton and Tonge Improvement Bill.

June 18.

The Birmingham Improvement Bill, as amended, was considered, and ordered to be read a third time.

June 19.

The Portsea Gas Bill, as amended, was considered, and ordered to be read a third time.

Three petitions were presented against the Parochial Assessments Bill.

June 20.

The Middleton and Tonge Improvement Bill.—The Lords amendments were agreed to.

The Whitworth Vale Gas Bill, was read a third time, and passed.

One petition was presented against the Parochial Assessments Bill.

The Sale of Gas Act.—A petition was presented from the Haslingden Gas Company, praying for inquiry into the working thereof.

June 21.

The Birmingham Improvement Bill was read a third time, and passed.

June 24.

The Weston-super-Mare Gas Bill was reported, without amendment, and ordered to be read a third time.

The Wolverhampton New Water, the Fylde Water, the Staffordshire Potteries Water, and the Wigan Gas, Meter, and Fitting Bills were reported, with amendments.

The Leigh District Gas, and the Portsea Gas Bills, were read a third time, and passed, with amendments.

The Grand Junction Water Bill, as amended, was considered, and ordered to be read a third time.

June 25.

The Sale of Gas Act.—A petition was presented from the Omagh Gas Company, praying for inquiry into the working thereof.

June 27.

The Weston-super-Mare Gas Bill was read a third time, and passed.

A message was received from the Lords, intimating that they had agreed to the Leigh District Gas Bill, without amendment.

June 28.

The Grand Junction Water Bill was read a third time, and passed with an amendment.

HOUSE OF COMMONS.

(*Before Mr.* Tomline, *Chairman; Mr.* Rich, *Colonel* Maxwell, *Sir* Thomas Burke, *and Mr.* Vivian.)

BLACKBURN WATER BILL.

Monday, June 17.

Mr. Calvert, Q.C., and Serjeant Bellasis appeared for the promoters; Mr. Overend, Q.C., Mr. Russell and Mr. Jones for the corporation of Blackburn, petitioners against the bill.

Mr. Calvert in opening the case gave a brief history of the proceedings of the Blackburn improvement commissioners in 1844, relative to the supply of water to the town, and of the circumstances which led to the formation of the company. He stated also the nature of the works they had created, the capital which from time to time they had raised by shares and otherwise, the necessity out of which their present application to Parliament had arisen, and the additional works they proposed to construct, in order to meet the increased demands made upon them, and for extending their works to the surrounding townships. Having put the committee in possession of these facts, he proceeded to say that the only petition presented against the bill was one from the corporation of Blackburn. He submitted that it was hardly fair that the company should be met with this opposition, seeing that the corporation appeared against them in the House of Lords, and proposed certain clauses in the bill. He did not wish to exclude the petitioners altogether, but he thought the committee would agree with him, that this was not a case in which they should be allowed to proceed on the preamble. The company were perfectly willing to prove their case from the beginning to the end, and were by no means desirous of avoiding the strictest inquiry; but, according to the practice of Parliament when petitioners opposed on clauses in one House, it was not usual to allow them to proceed against the preamble in the other. The petition commenced by setting forth generally the scheme which had been carried out, and narrated the story of the commissioners, to whom the corporation succeeded in the management of the town. It then stated that, since the passing of the Blackburn Improvement Act in 1854, the corporation had been engaged in extensive works, the object being to account for their not having undertaken any measures for the supply of

water under the powers conferred upon them by that Act, to purchase the works of this company. It then stated that, in the opinion of the petitioners, the water-works should be in the hands of the corporation, which was certainly an extraordinary allegation, considering that the company were forced to undertake the supply, owing to the refusal of the commissioners to have anything to do with it. He (Mr. Calvert) deprecated altogether the notion of a municipal body, first of all declining to undertake so important a branch of the public service until it had been successfully carried out to a certain point by private enterprise and capital, and then coming forward to require that the company should be compelled to part with their works to them. The petition then alleged that the corporation had directed a scheme to be prepared for the supply of the town, but had subsequently considered it advisable to postpone their application to Parliament for another session. It stated that the steps taken by the corporation were well known to the company, and it was insinuated here, as it was also stated in the petition to the House of Lords, that the company were seeking to increase their works, in order to augment the difficulties in the way of the corporation buying up the undertaking. The petition stated that the estimated expenses of the works were exaggerated, and that the company were increasing their capital unnecessarily, for the purpose of defeating the object of the corporation. It alleged, also, that the power sought to extend the supply of water to places beyond the town was a breach of faith with the corporation, and would prevent the water-rate from being reduced. In answer to that, he would state that there never was an arrangement, directly or indirectly, on which any suggestion of a breach of faith could be grounded; and, such charges as this, though they were easily refuted, ought not to be launched before a committee of the House of Commons; especially, when having made similar charges in the House of Lords, no attempt whatever was made to prove them. With regard to the extensions of the works, the committee would hear from the witnesses for the promoters the necessity out of which they had arisen, and the public benefit which was likely to accrue from their execution. He had rarely opened a case which appeared to be more deserving of the sanction of the Legislature. The promoters had undertaken the supply of water to Blackburn at their own risk; and, with the most perfect satisfaction to the town, had conducted their operations to the present time; they now came forward with a well-considered scheme adequate to the existing exigencies and probable future requirements of the inhabitants; that scheme had already received the sanction of the other House, and he felt the greatest confidence that it would also meet the approval of this Committee.

Thomas Dugdale, Esq., examined by Serjeant BELLASIS.

I am a magistrate of the county of Lancaster and chairman of the Blackburn water-works company. I resided in the borough from 1820 to 1857. I now reside at Witton, which immediately adjoins. I was a commissioner of the town in 1844, when the subject of the supply of water was considered. I voted in favour of the revocation of the resolution first come to by the commissioners, to undertake the supply, because I thought there was a risk whether the works would pay or not, and because sufficient funds for constructing the works could not be obtained without rating the inhabitants. After that, some of the principal inhabitants of the town—the largest ratepayers and millowners—took up the question, and applied to Parliament for an Act. The commissioners opposed the bill, and appeared on petition against it. The Act passed in 1845; we immediately commenced executing the works, and, in January, 1848, began supplying the town with water. [Witness was examined at some length, in reference to the proceedings of the company for increasing their works from time to time, and also as to the raising and expenditure of their share capital, as given by him in evidence before the House of Lords. See JOURNAL OF GAS LIGHTING, No. 225, page 389.] The corporation obtained a permissive power in their Act to purchase our works; but no attempt to exercise the power has been made until the present year.

Cross-examined by Mr. OVEREND: The commissioners, in 1844, thought it better to leave the matter in the hands of private individuals, rather than that it should be taken up by those who had been appointed to manage the affairs of the town. The mains of the company were extended to Witton before I resided there. The pipes extend up to my house, but the amount of money expended by us in the township is very trifling. The number of houses we supply there, without the authority of Parliament, is between 300 and 400. The population of that part of the township to which we intend to go is increasing, but it is very small in proportion to Blackburn. By our existing Act, we are confined to the town and neighbourhood; and we have included Witton and Livesey in the bill now before the committee, because we were advised that, if the inhabitants of those places petitioned Parliament, we should be compelled to supply them, seeing that we are taking the supply of water from them by our proposed new works. I am aware that, since the corporation obtained permissive power to purchase our undertaking, they have been engaged in extensive sewerage works; that they have built a town-hall, and laid out several streets, and a large park. They have also straightened a portion of the Blackwater, and improved the market-place. I do not know what they have spent in the improvement of the town; it is a large sum of money. It has been talked about that they intended to go to Parliament, for two sessions, but they have never proposed a water scheme. Their Act does not require them to raise money for the purchase of our works. They have verbally proposed to give to our shareholders 6½ per cent. in perpetuity upon £71,868, whereas we have spent £91,732; and they offered to pay the trade debts of the company up to the time of purchase, not exceeding £500. They offered, in the House of Lords, to put that proposition in writing; but I told them we would not take it. The average share dividend we have received is £5. 2s. 8d. per cent. per annum. The rate we paid last year was 7 per cent.; we have paid as much as 7½ per cent. Of the £91,732 we have expended, there is £12,250 borrowed money, the interest upon which varies from 4 to 4½ per cent. The money we borrowed and converted into shares was not spent for an illegitimate purpose, but for the new service-reservoir. We had no authority from Parliament to do it. There are some houses in Blackburn which are not supplied with water; but I do not believe there are many. I attend the meetings of the directors pretty regularly, and I do not know of any case in which application has been made to us to furnish a supply within our power that we have not complied with. The water is always on. We cannot compel the people to take it. We do not filter our water now. There is a mill close to our proposed service-reservoir, the proprietor of which has the right to throw ashes into the stream. Whenever we take the water for domestic purposes, we shall compensate him. I believe we have the power to do so under our present Act. I do not know how much coal per week is consumed at that mill.

Re-examined by Serjeant BELLASIS: In our Act, there is a power reserved to that millowner to throw ashes into the reservoir, but it is confined to that.

By the CHAIRMAN: We have not had any complaints of the quality of the water.

By Serjeant BELLASIS: The clause does not authorize any other refuse from the mill to be thrown in. In the bill now before Parliament, we thought it right to keep the clause respecting the Hoddlesden Brook mill in the same position. We can supply Witton cheaper and better than it can be supplied in any other way. All the water we take now comes through Lower Darwen; and the whole of the water-shed through that place and Livesey to Witton, would not come to Blackburn at all.

Mr. VIVIAN: I see by the 16th section of the bill that you cannot raise any new capital, except with the consent of three-fifths of the shareholders; and, by the 14th section, the power to make these works is only a permissive one. What guarantee is there that these works will be carried out?

Witness: We cannot raise the capital, unless three-fifths of the shareholders agree; but, so long as the town is increasing, and we can pay a tolerably good dividend, there is no doubt the shareholders will be willing to raise the capital, and we shall construct the works according to the demand.

Mr. VIVIAN: But the supply of the whole of this district is made dependent upon the will and pleasure of three-fifths of your shareholders?

Witness: It is so.

By the COMMITTEE: The large new reservoir will be a mile and a quarter from the town. There are no provisions in the bill respecting the supply of water to public drinking fountains. We are not compelled to supply them; but, practically, we do so at a very trifling expense.

Mr. *Thomas Howard*, examined by Serjeant BELLASIS.

I reside at Blackburn, and am the land-agent of Mr. Fielding, the lord of the manor. From holding that office, I have become acquainted with the present requirements of the neighbourhood as regards the supply of water. The town of Blackburn, and the townships of Livesey and Witton, are increasing in population. Within the last ten years, the population of Blackburn has increased 16,504 or 35½ per cent.; and the rateable value of property in the borough has increased £37,426, or 37¼ per cent. The area of Blackburn is 3681 acres. A considerable portion of it is above the level of the service-reservoir. Within the contour line of the level of that reservoir, there are 1581 acres. The town proper and population are confined to the banks of the Leeds and Liverpool Canal, and the rivers from which the mills receive their supply of water. There is very little of the land of Blackburn which is eligible for the erection of houses, above the level of supply by this company, which is not already provided with water. The increase in the population of Witton during the last ten years is 1924, which is at the rate of 140¾ per cent.. The rateable property of the township has increased in the same period £1075, or about 53¾ per cent. The area of Witton is 699 acres. There are only about 65 acres laid out for building purposes; and it is not likely there will be more than that for the next fifteen or twenty years. In Livesey, the increase of population in the last ten years was 924 or 34¾ per cent., and the rateable value has increased £3738, or about 55½ per cent. The area of Livesey is 2035 acres. About 55 or 60 acres, immediately adjoining the township of Blackburn, may be built on during the next ten years. At present, it is almost destitute of water for domestic purposes, and it is very desirable there should be an improved supply for both townships. I have made a survey of the gathering-ground of this company, and it is a fact that the natural water-shed from the land is to the river Blackwater below the town. I have never heard complaints of the quality of the water supplied by this company, but I have heard complaints of a deficiency in quantity. In my opinion, the water-works should remain in the hands of the present company rather than be transferred to the corporation.

Cross-examined by Mr. OVEREND: Mr. Fielding and Mr. Dugdale are the principal land-owners in Witton. I know that there are water-works at Over Darwen, but I am not aware that the company there have offered to supply the townships around Blackburn. I know there is one district of the town which cannot be supplied during the day, on account of the heavy draught to the town at the low level. Witton is on a much lower level, and the want of supply only refers to those houses at Lyme Hill, which are on the highest level. The better class of houses are in the neighbourhood of the park, which is considerably higher up the Preston road. I do not think Lyme Hill could be fully supplied during the day if it were not for Witton. The increase of population of Witton is confined to the area I have mentioned. There has only been one house built in the district beyond that during the last fifteen years.

Re-examined by Serjeant BELLASIS: The contour line of the reservoir lies just below my house, but the company cannot give a supply for some distance below that. The number of houses at Lyme Hill would not exceed twenty; I should think there are not more than a dozen.

Mr. *Thomas Burgess*, examined by Serjeant BELLASIS.

I am a land-agent, living at Blackburn. I represent Mr. Carr and Mr. Armistead, who are two of the principal owners of land in the township of Little Harwood. There is land in that township bordering upon Blackburn which is laid out for building purposes. The part so laid out is not capable of being supplied naturally with water, so that the proposed extension of this company's works to the township will be of great public advantage. There are 300 acres of land in Little Harwood suitable for building, and within reach of the company's supply. [Witness was examined and cross-examined at some length, and by reference to the map as to the position of the township and of the mills, &c., erected and in course of erection.]

Mr. *William Hutchinson*, examined by Serjeant BELLASIS.

I live at Over Darwen, and am mineral agent for his grace the Duke of Buccleugh. I know the site intended for the Fishmoor reservoir, and for the Waterside reservoir which adjoins the Hoddlesden reservoir, and I have been mineral agent for the Duke of Buccleugh in this district thirty-five years, so that I am perfectly acquainted with the coal and stone mines in that neighbourhood. I have looked over the land on which it is proposed to construct the reservoirs. There is no coal there that can be worked. There may be smiths of coal, but no workable coal. My father had a colliery in the neighbourhood, but it would not pay the wages. I know the Waterside reservoir district, as I was born on part of the land, and have been in the neighbourhood all my lifetime. There is no coal there. They have been boring during the last few years, for a depth of 77 yards, and have found none. There is no strata in that district which corresponds with the coal measures in Lancashire. I think the reservoirs may be safely erected on the proposed sites.

Cross-examined by Mr. OVEREND: My father's colliery was on the west side of the Fishmoor reservoir. The borings which have been lately made are on the Waterside. There is coal under Blackburn if you go to niceties, but it is coal-lead. There is coal at Harwood and Livesey. There is a coal-pit at about 40 yards distance above the existing reservoir. It is a very good coal, and lies on a higher strata than our mines generally.

Re-examined by Serjeant BELLASIS: It is a good coal, but can never injure the works. I believe there is no workable coal under the proposed reservoir. They only bored in order to make out a case for compensation, the same as they do in all these cases.

J. F. Bateman, Esq., F.R.S., examined by Serjeant BELLASIS.

I am a civil engineer, and engineer of various important water-works. I know the district of Blackburn very well, and laid out the existing works of this company in 1844. [Witness repeated at great length the evidence given by him in the House of Lords on this bill, in reference to the construction of the works, the increase in the consumption of water in the town, and the steps which he had taken to meet the demand made upon the company. He detailed his plans for the proposed new works, the calculations of rainfall in the district upon which his estimates were based, the provisions made for compensating millowners, the character of the water, and the mode in which it was intended to employ the reservoirs, &c., &c.] The ashes which are thrown into the Hoddlesden reservoir are not objectionable; ashes form by no means a bad filter. Every other kind of refuse is prohibited by law from being thrown into the reservoir, and we can prevent it. The water might be filtered, if found necessary; but I do not think it is so. We commenced by filtering, but we found that the system of allowing the water to settle, and then decanting it, was quite sufficient for all practical purposes. The quality of water at present supplied to Blackburn is very good. The millowners are all satisfied with the arrangements we have made. My estimate for the construction of the new works is £60,000 net. The capital proposed to be raised is £115,000, and there is a borrowing power in the bill. The money required to be laid out immediately is about £75,000, and the gradual extension of the town will probably necessitate an outlay of £1500 a year, for the next twenty years. The whole of our gathering-ground sheds into the river Darwen, and no part of it sheds to Blackburn. It would not, therefore, have been just to the district, nor wise on the part of the company, to take that water, and not include the townships in this bill. The fact that they are included cannot be a hindrance to the purchase hereafter by the corporation, for, if it is beneficial to the company, it would be equally so to them.

Cross-examined by Mr. OVEREND: The open culvert which I propose to construct between the reservoirs will be a flood watercourse, and will not be at all objectionable. We have a covered one now, but that is only three feet across, and was covered for the purpose of not interfering with the land. It would be throwing away money to cover the proposed large culvert. There is no proposal in the plans to be executed under the powers of this bill, for a filtering-bed; but we intend to filter the water, if necessary. We do not require powers for the purpose, and we shall have plenty of money to do it with. We have filters already constructed, but we do not use them now, and do not expect we shall require them hereafter. I know the mill at the Hoddlesden reservoir; it is not a large one for that district. I am not aware that they are erecting sheds for the employment of 200 additional hands. I am aware that they throw in their ashes. I do not know what is their weekly consumption of coal. I do not know that I should be surprised to hear that they consume 50 tons a week. I have no idea of the quantity of ashes that that consumption of coal would produce. If it is a poor coal, there would be a good deal of earthy matter in the ashes. They may contain a good deal of sulphur; I do not know that that would be deleterious to the water for drinking purposes. Between the Daisy Green reservoir and the Pickup Bank, there is a stream which issues as yellow as a guinea; it is full of oxide of iron, and colours the brook, and the stones of the brook; but, before it joins the main stream, a quarter of a mile off, it loses its colour, and the water is fit to drink. We would rather be without these things; but, nevertheless, the water at Blackburn is perfectly unobjectionable. We should intercept any of the ashy matters that float before they could get to the service-reservoir, by means of a grating. In the Manchester Water-Works, we have miles and miles of open watercourse, and yet there is not a city in the world where the water is so beautiful as in Manchester; not even Glasgow. The water there is decanted and deposited. In autumn, the leaves collect on the surface, but we intercept them by gratings. There is no drainage from the cottages which goes into the brook at Hoddlesden, the people husband their material too closely to allow it to do so. I do not know that the contents of the cesspools at the Rock Vale Mill go into that stream, but if they do, we can easily prevent it close to our works. Gas-tar is not allowed to pass in; they would be liable to an action if they did so. The same thing that occurs here occurs everywhere else, without affecting the water. You cannot go into that district, within any reasonable distance of Blackburn, without finding it occupied with buildings. *Cæteris paribus* I would rather have a stream which could not be contaminated; but you cannot get it; there is always either distance or cost or quality of water to be considered. Whatever is necessary for the purpose of keeping the water as pure as possible, we shall do. I know exactly what amount of deposit there is in that reservoir; it is 200,000 cubic feet. I do not know whether it is intended to clear that out. In case of flood, some of it would be carried forward; but it would not reach Blackburn, as it would deposit again when it got to still water.

TUESDAY, JUNE 18.

Mr. *Bateman*, recalled, and cross-examination resumed.

The entire gathering-ground of the existing works of the company is 800 acres; there are 1260 acres for the Hoddlesden reservoir and there are 360 acres besides, which will be intercepted by the conduit and collected in the Fishmoor reservoir. There are not many houses near the new drainage-ground; it is an agricultural district, but not richly manured. There is no sewerage, in the sense in which we understand it in towns. There is no fear of frogs spawn being deposited in the culvert; it is an absurdity, which I am surprised to hear; and if that is all that can be urged against the plan, it is nothing. The rainfall is about 40 inches in the upper district, and 33 in the lower. We have rain-gauges at the Guide and Pickup bank reservoirs. The right way to estimate the rainfall is to take an average of two or three consecutive dry years. Our observations at Blackburn have not been sufficiently extended to enable me to give precise figures; but there are other observations in the immediate neighbourhood, from which we can determine the point. I allow in both districts, in making my calculations, 15 inches for loss by absorption, evaporation, and other causes, which leaves 25 inches as the available water above the Hoddlesden reservoir, and 18 inches above the Fishmoor reservoir. The old storeage was 20 million cubic feet for the service of the town, and 10 million cubic feet for compensation; the new storeage will be about 48 million cubic feet in the Fishmoor reservoir and 10 million in the Waterside reservoir. The cost of works for filtration, if it should be necessary, would be from £1500 to £2000. There are only about 7 per cent. of the occupied houses in Blackburn, which are not at present supplied with water by the company. There may be some of the houses in the Park district above the level of the company's mains. There would be no difficulty in supplying them by pumping, except the cost. The working cost of raising 1000 gallons is about a halfpenny per 100 feet. If the town were so to increase in that direction as to make it worth while, the company could, and would do it, as there is no objection except the expense. The Over Darwen Company's works are not very large. They have about 300,000 gallons of water per day more than they want. There is no physical difficulty in their supplying a portion of Livesey from their works. I proposed that the two companies should be amalgamated, because to the extent of the over supply which the Darwen Company possess, it would be cheaper than any other plan at present; it would not do for any great length of time. My estimate of £57,000 to £60,000 is merely for the execution of the works laid down on the parliamentary plan. In addition to that, there would be the requisite extensions of the pipes in the town. These pipes have been laid down for many years, and it is necessary to increase the size of many of them to bring up the pressure to what it formerly was. The immediate cost of those extensions would be from £5000 to £6000.

Re-examined by Serjeant BELLASIS: I have no apprehension that the coal will interfere with our works. It would be very expensive to cover in the proposed culvert, and quite unnecessary. The more you expose water to light and air, if there is any colour in it, the more likely are you to deprive it of that colour. The water also gets aërated, and is better for domestic use. Upon the whole 1260 acres which drain into the Hoddlesden reservoir, there are but 122 houses or small cottages, which is one to every ten acres. It is very difficult to find a district with so small an amount of population upon it. As long as the board of health do not go into a district, and begin their sewerage works, the streams are comparatively pure, but whenever they go into a district they spoil it. They have not gone into this district yet. The diminution of pressure in the town is due partly to the extension of the pipes, and the draught upon them.

By the CHAIRMAN: We have not used the filters for the last twelve years. The sewerage of Blackburn goes into the river Blackwater, which joins the Darwen below the town.

This was the case for the promoters.

Mr. OVEREND said he thought he should be able to convince the committee that this was a scheme which ought not to be sanctioned, or which, at all events, ought to be postponed for some time. In reference to the observations of Mr. Calvert, in which he reflected upon the commissioners for the course they adopted in 1844, he remarked that they had then no authority to take upon themselves the supply of water to the town, and simply did their duty in refusing to entertain the proposal, as was clear from the statement of the chairman of the company, who was himself a commissioner, and voted against it. The company, too, were not entitled to the credit which his learned friend bestowed on them, for, after all, they only entered upon the matter as a speculation for their own private benefit and advantage. By the Act of 1855, the management of the town was transferred from commissioners to the present corporation, and power was given to them to purchase the works of the company, and take the supply of water into their own hands. His learned friend had complained of the terms "bad faith" in the petition now before the committee; and, though he (Mr. Overend) objected to such terms being inserted in a petition, there certainly was bad faith on the part of the promoters of this bill in one sense—viz., that the bill did not re-enact the purchasing clause of the Act of 1855, but, in point of fact, repealed it; and it did so not in express terms, but by extending the area of the company's operations beyond the jurisdiction of the corporation of Blackburn; because the corporation could only buy works for the supply of the borough itself; so that it would be impossible, if the bill passed in its present shape, that they could ever become possessors of these works. It had been urged against the corporation that, though they had for some years possessed a permissive power to purchase the undertaking, they had not exercised that power; the fact being that they had been expending large sums of money in other great works in the town, which it was absolutely necessary should engage their attention preparatory to doing so. Having carried these out, they, in 1859, took into consideration the purchase of the water-works; but the company, getting wind of it, and finding that the corporation had resolved to postpone the matter for another session, promoted this bill, the effect of which would be, as he had said, to deprive the corporation of the power to acquire them. This appeared to him to be a great injustice; and the corporation, having regard to the interests of the town, felt that they ought not to be placed in so false a position. The learned counsel proceeded to state what were the objections which the petitioners entertained to the scheme now before the House, and said he would refer first to the quality of the water.

Serjeant BELLASIS objected that the point was not raised by the petition, and no cross-examination of the witnesses had taken place upon it.

Mr. OVEREND said his object was, to show what the quality of the proposed future supply would be, and, for that purpose, he might state what had been already proved—viz., that the company adopted no filtering process at present, and did not contemplate doing so. He submitted that the supply must necessarily be very unsatisfactory. The company had a large reservoir, called the Hoddlesden reservoir, adjoining to which was a mill and a number of cottages, the owner of the mill having the right, specially reserved by the bill, to throw ashes into the reservoir, and which the company could only prevent by giving him compensation. The borough of Blackburn objected to water so defiled, and, though it was said that ashes did no harm to the water, the committee must not take that as proved, for he should be able to produce evidence directly to the contrary. Hitherto, that reservoir had been used only for compensation purposes, but now it was intended to use it for the supply of the town, and, therefore, some means ought to be taken to prevent the impurities which must necessarily find their way into it. Then, again, there was to be an open culvert, which was decidedly objectionable; and provision ought to be made to cover it, and prevent the soot and dirt which, near a large town, were always to be found in the atmosphere, as well as the drainage of the surrounding district, finding their way into the water, and being carried into the storeage-reservoir. What would be the effect? Why, that whatever was turned up by the flood would all be carried down the stream, and the scum of it floating on the surface would be conveyed into the storeage-reservoir. The opponents, therefore, objected to the scheme on this ground. They alleged that there was an open culvert, and that the reservoir was uncovered. In London, the New River Company had been compelled to cover over every portion of the reservoir, but here the company not only had their reservoir uncovered, but they brought it close to the very limits of the town of Blackburn. Instead of having their storage-reservoir three miles off the town, where it could be kept free from the soot and smoke of the place, they brought it to the verge of the borough, where all the impurities created by the inhabitants congregated. This was not only an injurious locality now, but it was likely to be worse hereafter, by reason of its being open, and by reason also, of the inhabitants becoming more dense. This being so, the

opponents alleged that the scheme was defective, because of its not having some filtering arrangement. Then it was defective, because the reservoirs were on a low level, so much so that a certain portion of the town of Blackburn was not supplied with water in consequence. The upper portion of the town, for instance, ought to be supplied, but was not. The company did not supply it, and there were various other districts besides which had no supply. Then the opponents further alleged that the scheme was defective, because the supply was impure, and that it was not covered in. Mr. Bateman was fond of Loch Katrine, but if the company compared Loch Katrine with Blackburn or Bolton, they would find that there was no analogy between those places, and that it was trifling with their understanding to introduce the subject. At Blackburn, impurity was got. At Loch Katrine, purity was obtained, and water clear as crystal. At Blackburn, there was a large population, and considerable consumption of coal, and, therefore, there was no real comparison between the one place and the other. Having already addressed himself to the question of filtering, he would only add that Blackburn had now a defective supply, and that the town unquestionably required an increased supply. He believed that, for the purposes of the town itself, a great deal more water was required than it at present possessed. One of the great objects for which it was needed by the corporation, was to flush the sewers. There was no security for that essential object provided for by the bill; in fact, there was no security that the sanitary condition of the town would be at all attended to. With reference to the security of the town, it was contended by the opponents that the water ought be supplied to domestic purposes, and then to sanitary purposes, before any large quantity was abstracted for mill purposes. The company ought not to deprive a large town of a proper supply for domestic purposes, but here the great supply was first given for the purposes of trade, and then some was given for domestic purposes. Then, again, what caused a great deal of the insufficient supply at Blackburn, was occasioned by water being given to Witton and other adjoining districts, where the company had no right to introduce it; and, yet they were now proposing to introduce it into various other townships. It was said that these other townships had a claim upon them, and that the water ought to be made to flow into these townships as well as into Blackburn; but he contended that Blackburn was the important town of the district, that its wants ought to be considered in the first instance, that the water-works were originated for the town of Blackburn, that the corporation of Blackburn had a clause containing a right to purchase, and that that was a right which ought now to be continued. Then, let the committee see how Blackburn was interested. Blackburn was interested in having its supply of water as cheap as possible. The dividends of the company were at present 7 per cent.; but, how were these dividends to be kept up, unless the inhabitants of Blackburn paid an increased rate? If Witton was to be supplied hereafter, it would be by extending the mains into a district which was not populous, and if other districts were in like manner to be supplied, it would be by extending the mains into places which also were not populous. Where the population was scattered, the mains had to be taken a very considerable distance, thereby entailing very great increase of expense; and who was to pay it? Why, it must be paid by increased rates on Blackburn. In fact, the inhabitants of that borough would have an increased rate levied upon them for the benefit, in reality, not of Blackburn, but of the out-districts. Witton would thus be benefited by means of the town of Blackburn. The corporation of Blackburn, who were ignored altogether in the matter, alleged that it was for the benefit of the out-districts that the present scheme was now brought forward. Hence it was that that body now came before the committee to prevent the scheme from being carried out, declaring that there was a large portion of the town of Blackburn which was not supplied with water; and that, instead of the company extending their supply to the out-townships, their business was to supply the town of Blackburn better than it was supplied at present. The objections of the corporation were threefold:—First, they said that the scheme was a bad one, because it brought down impure water now; secondly, that the culvert was open, and that it ought to be covered; third, that the reservoir was open, and that it ought also to be covered; that there ought to be pumping apparatus; that the supply ought to be confined to the town of Blackburn itself, the inhabitants there being the parties interested in the passing of the bill originally. He appealed very strongly on the part of the corporation, that they should have the cesspools of the town flushed, and that they were the persons who ought to have the control of the whole scheme in their hands. The corporation were willing to bring forward a scheme of their own, and to raise a discussion upon the whole question, whether they or the company should have the control of the water. Let the committee, then, postpone the present bill until the corporation came before them with their scheme in the next session, and let them refuse now to pass the preamble.

Mr. *Joseph Brierley*, examined by Mr. RUSSELL.

I am surveyor to the town of Blackburn, and have held that office since the month of August, 1857. I am well acquainted with the town of Blackburn. It is one of the finest towns in the north of England. The boundary of the town and township is identical. The total rateable value of the buildings is £137,776. In the year 1834, the corporation obtained an Improvement Act for the borough. The corporation, under my superintendence, have been engaged in carrying out various improvements in the borough. We have laid out a public park, 50 acres in extent, and a town-hall, and we have widened various streets, and are carrying out a new and very extensive system of sewerage. This has entailed a very large expense on the corporation. They have expended, since 1834, over £70,000 on these works. The park was purchased at so much an acre. There is a series of clauses in the Improvement Act, giving power to the corporation to purchase these water-works. By the Water-Works Act of 1845, these works were confined within the limits of the borough. Having reference to the public service, I am of opinion that it is desirable for the welfare of the public of Blackburn, that the power of purchasing the water-works should still be continued to the corporation. In fact, it is exceedingly desirable; and, also, that they should have the supply of water to the town. Our system of sewerage can be carried out much more advantageously for the public when that power is obtained. That is my reason for the opinion that the corporation ought still to have the power to purchase these water-works. Proposals have been made to the company by the corporation, within the last year or two, for the purpose of purchasing these works. The corporation have it in contemplation to carry out some further works for the purpose of improving the sanitary condition of the town. At the early part of last year and this, the corporation had it in contemplation to come to Parliament for power to carry out their additional works. They did not come this session, because they had not time to mature their scheme. I have made myself acquainted with the scheme proposed by the promoters of this bill. They contemplate some sources of additional water supply. In my opinion, it would be exceedingly objectionable on sanitary grounds to take the water from the source they propose. I think a considerable portion of the expense might have been obviated, and the works carried out with the same efficiency. I have no doubt that the quality of the water to be supplied would be of a very objectionable character. There is a power by the proposed bill to continue the throwing of ashes into the compensation reservoir. The kind of stuff now put into that reservoir is ashes. Ashes from the mill are thrown into it, and other deleterious matter is also thrown; and, also, the drainage from a small village flows into the stream, and from the bed of that stream I have seen considerable quantities of matter, most objectionable, arise. I think such a provision ought not to pass for the supply of a town with water from such a source. Mr. Bateman has said that he does not contemplate any scheme for filtering. I hold in my hand a piece of stuff of great impurity. It consists of light drift ashes and gas-tar. It was floating on the surface of the water, and was carried by the wind on the surface. It forms itself into layers, and it is to be found, to a very considerable extent, along the banks of the reservoir. It is quite plastic, and very offensive. This is only a specimen of a very large quantity deposited on the sides of the reservoir. I should not, by any means, like to drink water that was supplied to the town without filtration. It must be obvious that it must be bad. I have some specimens of the water here. These specimens were drawn from a tap in my own house. Some of them were drawn early in the morning. I ought, perhaps, to say that the water continues of the character this bottle [producing a bottle] exhibits, the first thing in the morning, for a minute or two, and then it comes off as we find it in the second bottle. This second bottle was also drawn at my own house, at mid-day, and it exhibits a fair sample of the quality drawn by the people in the various houses in the town. I know that persons who can afford it, have supplied themselves with filters in Blackburn, but the great objection to the supply of water of this character is, that poor persons cannot afford to supply themselves with filters, and the consequence is, that they drink the water where they can get it, without filtration. I am of opinion that the water should be filtered before it is supplied. I have heard Mr. Bateman say that the water for the supply of Blackburn, at present, is not sufficient, and I agree with him in that. The existing works of the company might be made to serve the borough properly, without incurring any extravagant expense—I mean, they might be properly developed for the supply of the town, for many years to come, at much less expense than is proposed by the scheme now before the House. I have not made any estimate of the expense.

By the CHAIRMAN: I am an engineer, and for seven years and a half I have been occupied in attending to sanitary improvements of the town.

Examination continued: It is a fact that there are many houses in Blackburn not supplied at present. Having reference to the capacity of the present works, and the elevation to which the water can be carried, nearly as much of Blackburn is now supplied as can be supplied by the present works. From what I know of the out-townships proposed to be supplied, the revenue likely to be derived from them will be very inconsiderable, having reference to the cost of supply. Bearing these facts in mind, I think that, if the company extend their works into the scattered districts, and where the revenue would not be remunerative, it is more than likely that such an expenditure as theirs would tend to the increase of rates within the borough. The company would naturally look to keep up the dividend; and the dividend, I think, will be decreased by the extension of the works to the out-townships. There is to be an increased capital and an increased expenditure, and I cannot see where the increased revenue is to come from, except from an increase of rates in the borough of Blackburn.

Cross-examined by Serjeant BELLASIS: I have said that if the out-townships are supplied, it may make the rates higher in the borough of Blackburn. I say the revenue from the out-townships is so inconsiderable that it will not pay the company to take the water there. I think it is not probable that the extension of mains alone, provided the reservoirs were already constructed, would in the out-districts be remunerative. If it were merely the cost of the pipes, the out-townships would not pay. Some part of the townships, particularly Witton, has a considerable population. I said just now that the existing works might be made sufficient to supply Blackburn. I have no experience as a water engineer. I never constructed any water-works whatever. The experience I have had, extending over the time I was learning—and upwards of seven years I have been officially employed—gives me some opportunity of judging works of this character; but I have not been engaged actually as engineer on any such works. I can make it obvious to the capacity of any gentleman in the room, that the works could be constructed for less cost than Mr. Bateman says. I have been surveyor to the commissioners of Blackburn for four years; but I have had no experience in the construction of water-works. The blackest of the specimens of water I brought here is dirty water. I am not a chemist. I cannot say that it is impregnated with the oxide of iron. My house at Blackburn is situated at Strawberry Hill, which is a most respectable district. The house in which I drew the specimens happens to be situated close to the end of one of the main-pipes. If there should be an oxidation in the iron, that is the place where such oxidation would take place. I do not think it probable that during the interval between drawing the water in a pure state, and the following morning, these appearances of oxidation would take place. Any draught will scour off oxidation. The pipe terminates at a short distance behind my house, but I have reason to believe that my supply comes from a lead pipe, which goes into the iron pipe in the neighbourhood of its termination. I say the corporation have been undertaking considerable public works—a market, a town-hall, and drainage. I applied, some time ago, to the secretary of the water company for a supply of water to flush the public conveniences with. The corporation, at that time, intended to erect some new public conveniences. Two or three of those that were down were very offensive, because of the want of a flush of water. I would not recommend the corporation to make any addition to them until I could get a supply of water. I applied to the secretary to know on what terms these could be supplied with water. After some time, I received a verbal communication from him to the effect that they were either to be supplied with water, or the company themselves would provide a man to attend to the periodical cleansing of these urinals. That would be a most inconvenient arrangement, I think, for a purpose like that—the sending round of a man, and the flushing of them with a few pints of water. I thought a reasonable arrangement might have been made for the supply of them at so much per annum. My applicatien was made in writing. The present secretary gave me the answer. I am not aware that the water company in Blackburn supply several charitable institutions gratuitously. I do not know that. I think the water should be filtered before it is supplied for use, because it contains the kind of deposit exhibited in the specimens. If that impurity consisted of oxidation of iron, filtration would prevent it. I mean to say that, if this were oxide of iron coming from the interior of the pipes, filtration beforehand would prevent it. What-

ever chemists may call them, there are solid particles in the samples. The filtration would go on before the water was sent through the iron pipes, and, therefore, I admit—I see now, but I did not see it before—I admit now that that filtration would not prevent the oxidation in the pipes. The supply is very constant in the pipes. The first effect of the flow through them would be to put the water in motion, and to bring away the impurities which have accumulated in the night. I do not know that that is a necessity of water-works, because I never experienced it. I never saw such impurity in the water at Burnley. The impure substances I have brought here I got on the banks of the reservoir, on the opposite side to the mill. I call a portion of this impurity a composition of ashes and gas-tar, with a little bit of stick in it. It is light cinder, somewhat like clinkers. I found it at the top water-level of the reservoir. I found a large quantity of it, which was drifted by the flood, and was deposited near the pitching along the embankment. The whole of the pitching of the bank was covered with it. I never saw such stuff used for impacting the pitching. I found a large portion of it upon the grass, where there was no pitching whatever. It smeared my hands. I took a sample of the pitching.

Re-examined: The specimens of water I have brought here look more like oxide of mud than oxide of iron. I think the matter in them is earthy matter. The district of Witton, which is well peopled, is already supplied with water, and that part which is not supplied is quite scattered.

Robert Rawlinson, Esq., examined by Mr. OVEREND.

I was one of the sanitary inspectors under the General Board of Health in this country, and am a civil engineer. I have also inspected and reported to the Government as to the sanitary condition of some of the principal towns in England. I was one of the engineers sent by the Government with the army to the Crimea. I have had great experience in hydraulic works. I have examined the present water-works at Blackburn. I have also examined the present scheme of enlarging the water-works. In my judgment, that scheme is very costly indeed. I do not think it will give the quantity of water Mr. Bateman contemplates, because he does not get any great increase of his area, and I think the area too small for the population contemplated. I inspected the first reservoir when it was nearly full, and I also inspected the mill above it, which stands across the stream which is the principal feeder of that reservoir; and I noticed that there was nothing to take away the refuse, and that the factory puts its whole refuse—the ashes from the furnace and the refuse from the surface of all kinds—into the stream. Those ashes pass directly into the stream which is the principal feeder of the reservoir. Higher up the stream, there are houses where the workpeople live that work in that factory, and I believe there are 250 or 300 hands now working in that factory; and roofed in and ready for machinery there is another factory, which will double the population, and of course double the amount of animal impurity as at present existing, except arrangements are in force for removing it. There is no provision in the present scheme for preventing that. I think it very objectionable that those impurities should pass into the stream, because they would have a decided effect upon the water. They would be most objectionable. I have heard the evidence given with respect to the pitchy impurity. I will not say that the bank is not pitched with asphalte, but it would be monstrously extravagant if it is, but I have seen material like that immediately outside the mill. Ashes and other refuse would produce similar material. It is not a manufactured article. If it were, the tar would have been boiled. If it were required for asphalte, the tar would have been boiled and dropped in cold water, and then it would not soil your fingers, as it does now. It is not asphalte. It might be used for pitching, but it is not the kind of thing I would propose for that purpose. In my opinion, it consists of the refuse from the works at the factory. It would have a deleterious effect upon the water. It would form prismatic colours on the water. I do not know what power the company have over the land parallel with the reservoir; but I know that, if the objection were made on the standing orders, and it could not be shown that they had the power to prevent that, they would have been thrown out upon the standing orders. Supposing a flood were to come into the upper reservoir; the effect would be, that if the reservoir was partially empty, it would mix the refuse with the water, and carry it down into the second reservoir. The water would go direct from the first reservoir into a conduit. Mr. Bateman says he will take the surface-water from the second reservoir, and that he will have an open conduit, 20 feet broad. In my opinion, that is not the sort of thing he ought to propose. I would never convey water by means of an open conduit, unless I meant to store and filter it for use. A conduit for flood-water will be liable to miss. In dry weather, it will contain nothing, and then you have rank vegetation growing up. There are animalculæ, beetles, and things, which would breed in the bottom of the shallow water, and you would have all that carried down into the lower storeage-reservoir. I most certainly would have a covered masonry culvert, instead of an open conduit. I am engineer for the water-works at Swansea. We have a covered conduit there, for taking away the ordinary volume of water for the supply of Swansea, eleven miles in length. With respect to the reservoir for storing, I think it very objectionable to have it on the site on which it is placed, near the town, because it would necessarily receive the smoke and soot of Blackburn into it. It is true that in London, Parliament has required that all surface-reservoirs should be covered. The Act compels also to filter and pass into covered condnits until delivered into the houses, and that ought to be the case here. I think the service-reservoir at Blackburn ought to be covered, and I think it essential to have the water filtered. There is a portion of oxide of iron in the sample produced here to-day, but the greater portion of it will be found to be vegetable matter. Oxide of iron is not absolutely deleterious, but it is objectionable. Either the mains are in a very bad condition, and have not been properly protected by a coating of varnish, or the water supply is worked intermittently, which allows the air to get in and act upon the pipe, enabling the pipe to oxidize; because, with a constant supply, and the pipes regularly full, scarcely any oxidation takes place. I have laid down not less than 100 miles of mains, and I have no evidence that in any portion of them, when varnished, the water oxidized. While the iron is new and clean, it is coated with a beautiful black varnish, and the effect of that is permanent. In my judgment, looking at the service-reservoir, and the condition of the conduit at Blackburn, a considerable portion of the samples produced here to-day consists of mud and vegetable matter. I have paid a great deal of attention to the sanitary condition of towns, and it is very important for the town of Blackburn, that the corporation should have the control of the water, but if they were not to have that control, except at such a cost as this Act will impose, I would not recommend them to enter into it. The effect will be, a tendency absolutely to impoverish the town of Blackburn, if this Act is passed. I think that the gathering-ground is too small, and that everything given outside Blackburn proper will be robbing Blackburn proper. Witton is a township, part of which adjoins closely upon Blackburn, but that part is already supplied, and the remaining portion is scattered. The more remote the houses are, the greater will be the expense. The company have a capital of £90,000, and they say they supply the greater proportion of Blackburn and Witton, and pay 7 per cent. dividend, but how they are to get that dividend under this bill I cannot possibly imagine, with a full market, except by increased rates on the borough of Blackburn, but seeing that Blackburn is now paying higher than many places, I do not see why they ought to get powers to increase the rates there. I believe Mr. Bateman said that the true way to obtain the rainfall was to take the average of the driest years when they came together. Unfortunately for Mr. Bateman, Nature does not operate in that kind of way always. She is not so content to act for his speculations, because a dry season may come wet sometimes, and it may have nothing that you can average it with. I hold, after considerable experience, that the true test of any water-works is the minimum supply of any year, and it is forcing the test even to do that. Now, taking England generally, I find in looking over the rain-gauges that the fall of rain in this country, and I believe it prevails to a great extent throughout the whole country, is about as 1 to 2, that, taking twelve months, we will say it is 1 in the dry year, and that in the wet year it is 2. It therefore ranges in all between 1 and 2. But how you are to average the 1 and the 2 I cannot comprehend, because you have 12 months to deal with, and the rain of 12 months to deal with. Then the rain falls very irregularly in the course of a year. In a dry year, you might register on the gauge several inches. It might so fall that you would not get off the ground a moiety of it, and, if you relied upon getting a moiety, you might be deceived. If it were a month dry, and a week wet, the ground is then in a condition to absorb a great portion of the rainfall, and you do not get it. You get the most rain when it is continuous. If you have a chain, and want to test its strength, you must take its weakest link; and so, in the matter of water, you must take the driest years. The reservoir here has gone dry for forty days in one year, and sixty days in another. Mr. Bateman promised to give the millowners a certain amount of compensation; and he made a reservoir to give it to them, but he does not give it. Therefore, he might have made a mistake in his other calculations. I have not tabulated the rates of Blackburn, but I know they are very much higher than some towns where the public bodies have executed their own water-works. In my judgment, the rates at Blackburn ought not to be higher than they are at present. The expense of pumping 1000 gallons at a small establishment like this would be as high as one halfpenny; but, taking other establishments, large and small, the cost would come to about one farthing.

Cross-examined by Serjeant BELLASIS: I know places where I carried out works at which the rates are lower than those charged at Blackburn. I know other places where the works are in the hands of public bodies, like the municipal body, where the rates are high. There are such things as rates-in-aid sometimes. There is a large deficiency, too, sometimes. There has been a deficiency of £26,000 sometimes. Works in the hands of public bodies do not always succeed, because there has been blundering, sometimes. I work on both sides, sometimes for the company, and sometimes for the public bodies, and there is blundering on both sides, sometimes. I say you should take the minimum year for the rainfall. If you were to range the months, you need not begin at January and end at January. I think 12 months are enough to estimate your quantity of rainfall, but not 12 consecutive months following each other. That would be the standard at which you would look. I should be sorry to commit a large population to any scheme that would not stand that test. Reservoirs are made for the purpose of getting over these irregularities. You might start me, in making my calculations, with all the reservoirs full, and I might start with all of them empty. Fifteen inches for absorption was what Mr. Bateman estimated; but I think he will lose much more than 15 inches on this ground. I have had accurate gauges for testing 2200 acres in the vicinity of Wigan. The volume of water flowing from the ground was gauged twice a day, and, in 1858, it gave 36¼ inches. The rain was gauged in an ordinary rain-gauge. The rain falling off the ground was measured by the proper apparatus trough. The rain-gauge gauged the fall of water, and one gauge gave 36¼ inches, while the other gave 14·8; showing that very much more than 15 inches was lost there. There were some floods in the two years the trial lasted, which could not be measured. I am only giving the results of two years out of ten. There were one or two days when the gauge gave way. I know that floods have gone past that gauge. My figures, then, are a matter of inference as regards a few hours. I am aware that Mr. Bateman said that figures would sometimes be wrong. In 1847, when he gave his evidence in the Manchester scheme, he said he would have 60 inches of rainfall, and that he would impound 36 inches. That is rather more than a moiety,—much more than 15 inches lost there. He found, subsequently, that it was 52 inches, and not 60. He promised 75 cubic feet; and, when he found that he could not fulfil that promise, he then said that it should have been 55 cubic feet. What I am now endeavouring to show is, that Mr. Bateman did not then calculate 15 inches as the loss. Taking 16 inches in the one case, and 36 in the other, it would give 24 inches of loss. I do not believe that Mr. Bateman will get anything like what he has calculated upon, and that the loss will be far more than 15 inches. Mr. Bateman has made quite as many mistakes as I have. I have constructed works at Wigan. I think the pipes at Blackburn should not have given such samples as we have had presented here to-day, and that they should have been varnished. Mr. Bateman first, I believe, used the varnish for the earliest portion of his Manchester works. With a town so far advanced in its supply as Blackburn is, you must empty and fill the mains at times. As a matter of fact, you must draw off portions or sections of water, when you want to tap the mains. Very probably the mains in London are not kept always full. I know, from my experience, that they can be always kept full, and that they are acting directly in the teeth of an Act of Parliament, in London, in not keeping them full. I do not know that the tar and ashes produced here to-day would float, but it is very easy to try, if you put them now into water. I know the water in Blackburn very well. As it passes from the two reservoirs, there is no more beautiful water anywhere. It is transparent and soft. It is anything but beautiful as it comes past the factory. There would be expense, and determination, too, to carry the refuse away from that factory.

This was the case on the part of the opponents.

Serjeant BELLASIS said that his learned friend had informed the committee that, when the promoters were before the House of Lords, the whole of this case had been very fully gone into, and that the promoters had remained in the committee-room to modify the conclusions to which that House had arrived. This was true enough. Some of the clauses were then agreed to, and no opposition whatever was expected on the preamble. In fact, the promoters proceeded to make the alterations in the clauses, on the supposition of the preamble being passed. The opponents now came forward, and alleged that the preamble was opposed.

of the Metropolitan Act provided, that if the parties could not agree respecting the security, the same should be determined by a magistrate, that the security might consist of a deposit with the gas company, or of a prepayment to the gas company, whichever the magistrate might consider sufficient and reasonable, and that the determination of the magistrate should be binding on all parties. Now, the promoters had copied the 28th clause word for word from the Metropolitan Act, thereby acknowledging that the magistrate should determine the nature of the security, in case of dispute, but the corporation proposed to put in the words, "What security, if any," so as to put it that the magistrate need not give any security whatever, if he thought proper. This was contrary to right reason and common sense. It was quite clear that, as the law compelled the company to supply the gas, it ought to secure them in the payment of the rent, and it ought not to be in the power of the magistrate to say that they should have no security if they desired to have security. The proviso now sought to be inserted had not been put into the Metropolitan Act, and the promoters objected to it here, contending that the words "if any" ought not to be introduced into the clause.

Mr. CRIPPS said he would subsequently state his objections to any alteration being made in the bill, those objections applying not only to this measure, but to every other the clauses of which had been settled by arrangement before either branch of the Legislature.

William Murray, Esq., M.P., examined by Mr. BAXTER.

I am a shareholder in the Portsea Island Gas Light Company. The statements in the preamble of the present bill are perfectly true in reference to the capital raised and required. I am an auditor of the company, and have been so since the year 1844. I am pretty well acquainted with the finances of the company. The company have had their works very considerably increased since the time of the Crimean war. They have had to supply the dockyards, and various barracks, the garrison, the royal marine departments, and other works; and, as the Government are building forts and barracks, and extending their operations at Cumberland fort, we shall be called upon to supply these new fortifications as well as Cumberland fort with gas. Taking the present census, and comparing it with the last, there has been an increase in the population to the amount of 20,000—from 70,000 to 90,000. Further capital will be required by us, in consequence of this increase. We are at the present moment called upon to lay out £12,000 upon a new gasometer. The money raised by us in 1852 was expended in 1852 and 1853.

Cross-examined by Mr. CRIPPS: I am a shareholder in the company and reside in London. I hold one-twelfth, and different other parties hold no more. A considerable portion of the shares are not held by parties residing in London, but by parties residing in Norwich. I am not aware that the directors of the company who reside at Portsmouth have been unwilling to make any alteration in the bill as it left the House of Lords; but, I heard that that was so this morning. I have heard them say that they approved of the bill. I saw this morning the alteration proposed to be made in the bill. It was in the handwriting of the chairman of the directors, and had reference to the power of appeal. It was a proviso to be added at the end of the clause, that the maximum price to be charged for the public lamps was not to exceed the present price, "except in the case of an increase in the price of gas by meter to consumers generally."

The committee declared the preamble proved. The clauses were then gone through. All the clauses, down to clause 17, were agreed to, without opposition. On clause 18 being read,

Mr. CRIPPS said that this bill had been brought, first of all, into the House of Lords, and it was there opposed by the corporation of Portsmouth. A good deal of evidence was given, and some discussion had taken place; but, after the first day, the promoters entered into an arrangement, whereby they agreed to meet the views of the opponents. Concessions were, in fact, made on both sides, and the result was, that the opposition was withdrawn on the part of the corporation. He (Mr. Cripps) was quite prepared, on this point, to refer to the same record—that of the shorthand writer—to which Mr. Baxter had referred as embodying, not the whole terms of the arrangement, but the substance of what Mr. Burke had stated upon the occasion. Mr. Burke's words were, that "all the points of difference had been settled"—that "all the principal matters had been conceded." Upon minor matters there might have been some dispute, but these were waived upon the chairman asking if they had come to a perfect arrangement. In point of fact, there had been an entire arrangement, on the faith of which the opposition was withdrawn. Before meeting upon the second day, all the clauses were agreed upon, so that, when the parties met, the clauses were put in, and all opposition was immediately withdrawn. The committee would see that the terms of the agreement were expressly stated in the clause, that the present price should not be exceeded in the public lamps. Although the corporation felt themselves bound, as far as possible, to protect the private consumers, yet the question of the public lights was chiefly before them, representing as they did the principal public body in the town of Portsmouth. The clause was then agreed upon, and finally settled. That clause, which was the 18th, carried upon the face of it the terms of the agreement in the strongest possible way. It said, that "the maximum price to be charged for the public lamps should not exceed the price or prices now charged for the same respectively;" and it went on to say that it should be lawful to appeal against the rate to the quarter sessions of Portsmouth. The object was that, under no circumstances, was the maximum price in future to exceed the price at which it was when the promoters obtained their bill; and that, if circumstances should occur, making a reduction desirable for the private consumers, parties might, by appealing to the court of quarter sessions, and acting on behalf of the corporation, go and get that reduction made. The 16th clause provided that the price at which gas should be sold by the company within the limits of the Act should not exceed 4s. 6d. per 1000 cubic feet, except in the event of an increase in the price of freight, coals, or other materials or labour, when the company might from time to time charge any further sum not exceeding, with the price then charged, 5s. 6d. per 1000 cubic feet. Then the 17th clause showed that the possible increase of price had been duly and fully considered, but that that increase was to be limited to the private consumers only; and, after having provided for that, and with a full knowledge of that provision, the 18th section distinctly provided that "the maximum price to be charged for the public lamps should not exceed the price or prices now charged for the same respectively." Nothing could be clearer than the intention, nothing clearer than these expressions, that though there might be circumstances which might render it necessary to increase the price to the private consumers, yet under no circumstances was the price for the public lights to be advanced. He (Mr. Cripps) stood in the broadest possible way upon public grounds in this matter. He contended that it would be intolerable, after the expression of opinion given in one House of Parliament, after the opponents had compromised the matter, after the points in dispute had been withdrawn, and after the clauses they wished to have inserted had not been brought forward, that the promoters should now come here and endeavour to reopen the whole discussion. If it were allowed to be reopened, the precedent would be a most intolerable one. If the matter had not been agreed upon, then it might be reasonable enough to reopen it; but, that having been agreed upon, would it now be reasonable to bring it again under discussion? He submitted that it would be most unreasonable to do anything of the kind. Why should they now propose to put in words that would have the effect of totally altering the clause? The 18th clause was distinct. It said that "the maximum price to be charged for the public lamps should not exceed the price at present charged;" and now it was proposed to add these words: "except in the case of an increase in the price of gas by meter to consumers generally." This was to say, that the company wanted to assimilate the price of the public lamps to that of the private consumer; for they said that, if it might be increased to the private consumer, it might also be increased to the public. But it was agreed that there should be no increase to the public; and yet they now wanted to put the public on the same level as the private consumer. This was a bill promoted by the gas company. It was a parliamentary application by them, and by them alone. *Non constat* that the committee of the other House would ever have consented to pass the bill, if the clauses, as now proposed, had been brought forward in their present shape. He hoped the committee of the House of Commons would not depart from all principle and precedent by the adoption of the course now urged upon them, because the matter had already been agreed and settled, and upon that agreement and settlement he took his stand.

Mr. BAXTER said the promoters did not now propose to go beyond the terms of the agreement in the slightest degree. If the learned counsel on the other side wished to take his stand on the very words of his bond — namely, that the maximum price in future should not exceed the present price, let him do so. That was the letter of the bond. If he was content to take that *simpliciter*, he (Mr. Baxter) was also content. But the amendment made in the previous clause, and to which his learned friend had assented, showed that the 18th clause had been drawn up hastily, and that the matter had not been fully discussed. Indeed, the committee would see at once that, as the clause stood, at present, it would not be fair to the company, and that it had not been truly represented by the learned counsel. As it stood, it would be competent for the learned counsel's clients to-morrow to give notice to the company that they meant to apply for a reduction of the price for the public lamps. But the learned counsel did not himself contend for such a right as that. He merely said that if the price could be reduced to the public, then his clients would have a right to seek for that reduction. That was the case he made, but that was not the entire of the clause. The clause as it stood at present empowered him to go at once for the reduction. He (Mr. Baxter) was ready, if his learned friend wanted the maximum price to be a stern agreement, never to be varied—he was content to take it so; but, if he meant to have an appeal, it should be an appeal that was mutual, open to both parties. If he meant to vary the price, there should be a power given to the tribunal to vary it either upwards or downwards; but the clause, as it stood, did not support that view, neither did it bear out the learned counsel's argument. If he sought for an appeal at all, let him make it a common sense appeal—namely, that the tribunal should make the price higher or lower, as it should see fit. Let there be an appeal, by all means, with a power to the tribunal to lower the price to the opponents, and a power also to raise it on the part of the company. He would put it simply so. If the learned counsel liked to have the present rate fixed and permanent, he (Mr. Baxter) would be content; but, if he sought for an appeal, then, on the appeal being made, let the company have the power to demand a rise in the same manner as the opponents would have the power to demand a reduction.

Mr. CRIPPS said that if Mr. Baxter wished to retain a power of appeal on the part of his clients, the opponents were quite content to grant that power. But the clause was plain, that the lights to the public should not be increased beyond their present price. If the recorder of the borough of Portsmouth should think there were circumstances enabling the company to reduce the price, then that reduction would have to be made, but, under no circumstances, should there be an increase; and there was nothing now advanced by the opponents which was in the slightest degree inconsistent with the clause as agreed upon, and upon which agreement the opposition in the Lords had been withdrawn. There was nothing whatever which could justify any difference of opinion now after what had been mutually settled upon in the Lords. He concluded by observing that he would reserve any questions of fact until afterwards, in case the committee should think it necessary that questions of that nature should be reopened at all.

The room was then cleared. On our readmission,

The CHAIRMAN said the committee had decided that they could not alter the clauses, as those clauses had been agreed upon in the House of Lords.

The whole of the remaining clauses of the bill were then agreed to without any opposition.

WIGAN GAS, METER, AND FITTING BILL.

FRIDAY, JUNE 14.

Mr. WYATT appeared for the promoters; Mr. LOCH, on behalf of the corporation of Wigan; and Mr. GREGORY, for the ratepayers of Ince.

Mr. WYATT said that this bill was presented by the Wigan Gas, Meter, and Fitting Company, and that it was an Act for better supplying with gas the borough of Wigan, and other places adjacent thereto, in the county palatine of Lancaster. The petition which had been presented by the corporation of Wigan was a mere watching petition, and was, in fact, in favour of the bill. It would be convenient that he should give a short history of the company and their doings, and, with that view, it would be necessary to divide the bill into two natural parts—first, that portion which related to the capital of the company, and with which the public were not concerned; and then to explain the nature of the works, and the powers proposed to be conferred upon the company, which did, to a certain extent, affect the public. The Wigan company was first incorporated in the year 1822, by an Act of 3rd Geo. IV. At that time, the subject of gas was very little understood, and, therefore, the capital was small. It was £10,000 only, with borrowing powers to the extent of £2500. They commenced to supply gas in the following year. The supply was comparatively small at first, but it outgrew the capabilities of the company, who set apart a portion of their profits year by year, in order to accommodate the inhabitants. The company consisted of several of the leading inhabitants of the town, some of whom were large owners of property, and they, being more mindful of the wants of the place than careful about making a dividend, it would not surprise the committee to hear that, for some years, they had realized